

NATURE MAGAZINE

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VOL. 28, NO. 1 • 35c

JULY • 1936



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BIRDS OF CHINESE TRADITION

John W. Maloney

UNDERGROUND OWLS

Hugo H. Schroder

DO YOU WANT PURE STREAMS?

Kenneth A. Reid

A SUN SMALLER THAN THE EARTH

Isabel M. Lewis

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PUBLISHED BY THE AMERICAN NATURE ASSOCIATION

To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and
Devoted to the Practical Conservation of the Great Natural Resources of America

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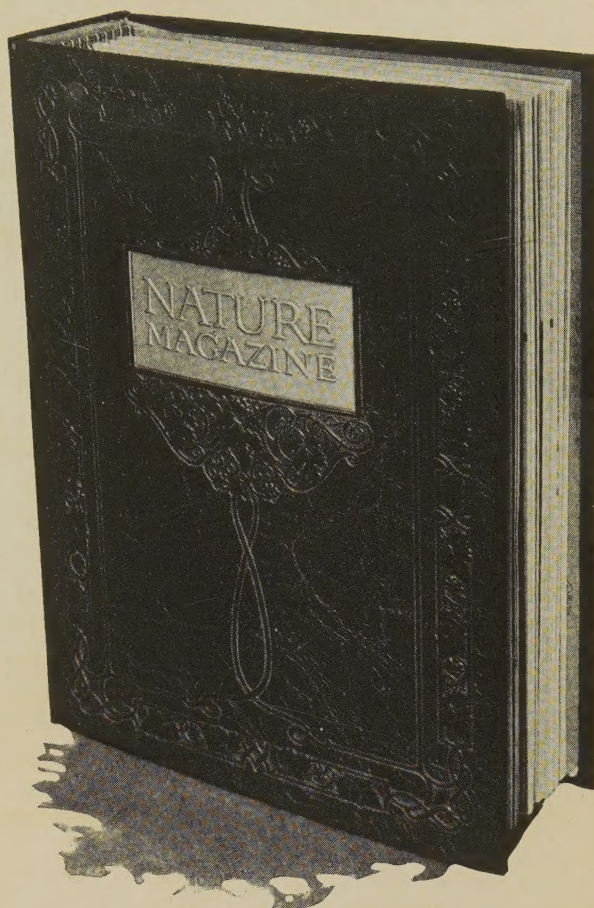
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V. 28

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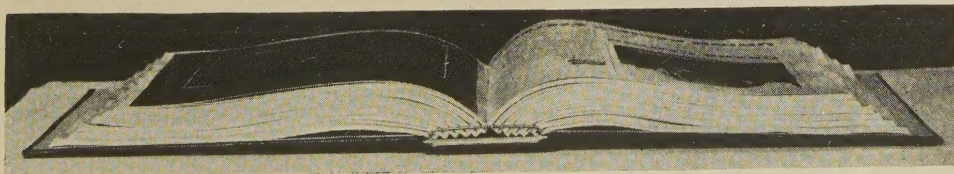
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Photographic Notes

BY SAMUEL BROWN

Snakes

One activity usually avoided by Nature photographers is taking pictures of snakes. This is probably because we have been taught from infancy to avoid any contact with these creatures. Only a comparatively small percentage of the many species of snakes found in this country are poisonous and these few are so characteristically marked as to make them easily recognizable.

While none of my many experiences with snakes have resulted in any unfortunate incident, it is not suggested that one should attempt photographing poisonous reptiles at first. Learn something about them and their habits before taking their pictures. It is always best to have an assistant along in case of trouble.

As is true in any phase of Nature photography, pictures of Nature subjects are most valuable when taken in or at the place where they are found. With dangerous reptiles such as rattlesnakes and copperheads, this is the only procedure recommended. It has been found that serpents look for the first avenue of retreat when discovered. However, if they cannot escape they usually assume a defensive attitude and remain motionless long enough so that the tripod may be set up and a fairly long exposure given. The obvious advantage is that the lens may be stopped down to increase the depth of focus. This also makes possible the use of a filter if the coloring of the snakes makes one necessary.

Harmless reptiles such as the garter snake, black snake and water snake may be caught and removed to a place that will provide better facilities for photographing. My first experience with a garter snake resulted in a series of fine pictures. We caught the snake and brought it home to our sunny back yard. After photographing it from several angles, I decided that I would like to have a close-up of its head. After several tries we finally accomplished our objective in the following manner. The camera was set up on a tripod and a stake driven into the ground. After focusing carefully on the top of the stake, the ground glass was replaced by the film pack adapter, the slide drawn and the shutter set at 1/25th of a second. An assistant, holding the snake in his hand, placed its head on top of the stake which was then quickly withdrawn and the shutter snapped. The stop used was F.8.

Snake photography is an interesting pastime and subjects are available no matter where you live. With a little care, this may be practised with complete safety.

* * *

Color Photography

Since the days of the first experimenters, it has been the dream of photographers to be able to reproduce pictures in their natural colors. While photographs in colors



A SCENE IN THE BERKSHIRES TAKEN ON SENSITIVE PANCHROMATIC FILM AT F.16, 1/25TH OF A SECOND. COLOR WOULD ADD MUCH TO SUCH A PICTURE

have been possible for about three-quarters of a century, it has only been during the past two or three years that new discoveries have made it practical for the amateur to engage in this fascinating field.

Motion pictures in color have been made successfully by the amateur for the past year with the aid of Kodachrome film. Last month brought us the new Kodachrome Artificial Light Film Type "A", announced in our June issue, which has extended activities to work under artificial light. This month brings us another new advance—Kodachrome film for 8 MM movie cameras.

1935 ushered in what is probably the greatest single step toward successful still color pictures—color film in rolls! Dufay-color film is available for amateur cameras taking sizes $1\frac{5}{8} \times 2\frac{1}{2}$ ", $2\frac{1}{4} \times 3\frac{3}{4}$ ", $2\frac{1}{2} \times 4\frac{1}{4}$ ", 35 MM and 16 MM. Taking pictures with this film is as simple as black and white; merely load the film into the camera and expose in the regular manner, allowing four times as much exposure as for super-sensitive panchromatic film or twice as much as for regular panchromatic film.

Fundamentally, photography in color is much the same as black and white. However there are several precautions which must be observed in the former which do not apply to the latter. For example, since pictures in monochrome depend for their success on shadows, they are essential in this type of photography. In color, renditions are in shades of color rather than in shadows. To capture these infinite degrees of shading it is important that the subjects should be lit as evenly as possible. A reliable exposure meter is not only desirable but essential. Modern films have extreme latitude which permits considerable over- or under-exposure without noticeable loss of quality. This is

untrue in color photography where exposure not only has an effect on the strength of the transparency but also on the color renditions.

Processing of color film is somewhat different from black and white in that it is finished as a transparency. For this reason development is achieved by the reversal method which produces a colored positive and no negative.

Color transparencies can now be printed on paper in all their beauty. This has been made possible by the *Chromatone* process which is the easiest method available at this time.

Literature on the taking and making of colored pictures is available from this department. Ask for *Color Photography for Universal Use* and *How to Make Home Movies in Full Color*, enclosing one three cent stamp for each one requested.

* * *

Camera Types

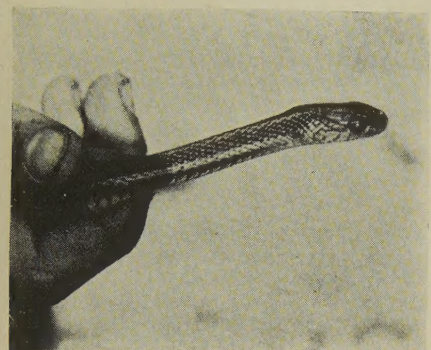
Reflex cameras work on a somewhat different principle than those discussed heretofore. They embody all of the features of a regular roll film or film pack camera with the added feature that each picture is focused on a ground glass where the image is seen full size and right side up, just as it will appear on the finished print.

Into the reflex camera class fall several varieties. The first of these which will be discussed is generally referred to as the "Graflex" type.

Essentially the Graflex type of reflecting camera consists of a box with a lens in the front standard, usually a fine anastigmat rated at F.4.5 or faster. The top of the cam-

era is a leather hood which is erected for use. As the operator looks into this hood he sees on a ground glass an image of the subject reflected there by a mirror set at a 45 degree angle. When the exposure lever is pressed the mirror swings up and automatically releases the focal plane shutter at the back. The image is thus visible on the ground glass right up to the instant of actual exposure.

The advantages of a reflex camera are obvious. The subject can always be kept in focus and the shutter released at the psychological moment. No allowance must be



GARTER SNAKE TAKEN AT F.8 AND 1/25TH OF A SECOND

made for parallax due to a separation between the finder lens and the taking lens, because the one acts for both. It is easy to determine the necessary stop opening for each subject since the depth of focus is visible on the ground glass screen.

The above described camera uses film packs, plates and cut films although roll film adapters are available for some models. The *National Graflex* camera, however, is made expressly for the use of roll film but embodies all of the features of its bigger brother and has the added advantage of compactness, light weight and economy of operation.

Pictures produced by reflex cameras are generally better as regards composition and arrangement of subject. The image is seen on the ground glass and immediately reveals the value of the subject for pictorial purposes. In photographing animals, where speed of operation is essential, the reflex camera is the ideal instrument.

* * *

Trade Hints and New Books

Proxars and *Distars* are supplements that can be attached to the regular lens on the camera to change its focal length. The purpose of the first mentioned is to include a wider angle of view than normal and the latter to give a telephoto effect or a larger image of a distant view. These lenses are invaluable for many purposes and are inexpensive in price. Their uses are described in an illustrated booklet available from this department. Send a stamped self-addressed envelope and ask for the "*Zeiss Proxars and Distars*" booklet.

The *Welti* camera is the latest thing in a miniature, low priced instrument. Using 35 MM film, equipped with a choice of high speed lenses, rapid Compur shutter and many other outstanding features, it is in-

(Continued on page 55)



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The Nature Lesson

By Virginia Ranson

The Nature study class had been studying that much-maligned little insect, known to adults as the praying mantis; to children as "the devil's riding horse." A creature of mystery and terror to the ignorant, the first mantis brought to class caused delightful shudders and shivers as it turned its clear bead-like eyes upon the eager watchers. When teacher coaxed the mantis upon her hand and received no fatal wound, some of the more daring allowed the fearless little animal to walk upon their hands, not minding the sticky feel of the six tiny feet. Soon even the most timid were clamoring for a chance to show their bravery. Then began a search for flies, which were fed to the hungry one by means of a pen point. As soon as its palpi touched a fly its saw-edged forelegs seized upon it in a vise-like grip which was not relaxed until every tidbit was consumed. Then the forelegs were properly cleaned. Its capacity seemed boundless. Between lunches it turned its head from side to side, apparently looking for more. This ability to turn its head, in which they excel most insects, and its habit of waiting for its prey with arms folded as if in prayer are largely responsible for its fascination.

The children learned that many were the superstitions in regard to this strange insect, whose pious attitude is merely a snare. They all agreed that "granny" or "pappie" had said, "If it bites you, it'll kill you." They also learned the value of protective coloring when their eyes could scarcely detect the little lady as she sat, a living statue amid the green goldenrod leaves. Many more things they learned but mainly that the mantis is the tiger of the insect world. One more lesson they learned entirely by observation.

Great was the interest in Mrs. Mantis throughout the morning. The afternoon brought her a companion. The small boy who brought in the smallish brown mantis was aglow with pride in his possession. Another fly hunt ensued. As there were other subjects to be studied, attention was reluctantly focused elsewhere. Then came the end of the day and a fond farewell was bade the tiny creatures as they hid coquettishly behind the window blind.

The next morning as soon as the door was opened there was a rush to the window. There on the sill in ghostly embrace were the mantises, locked arm in arm. Mrs. Green Mantis was smiling but Mr. Brown Mantis could not smile. He had no head! As the young naturalists watched Mrs. Green, she appeared to lick her chops and go on complacently nibbling whilst Mr. Brown's body twitched feebly and his legs quivered. Horrible sight! Here was the most forceful lesson of the week. How shall we express it? "The female of the species is more deadly" or the "fittest survives" or "don't turn two mantises loose in the same room"? Well, anyway it was an unforgettable lesson.

Rescue

By Ed Hall

It was one of those mornings when the first rays of the sun revealed a gigantic jewel robbery. Diamonds and opals and sapphires, in numbers that could not be counted, were captives of the huge spider webs woven between the pine trees. The

sparkling gems of dew were held till the rising sun took them from their captors, and once they disappeared the creator of the intricate lace-work ventured out to see what luckless traveller had been trapped.

One of the webs, a circular pattern four feet in diameter, hung between pine saplings more than twenty feet apart. It was secured by two slender threads fastened to the pines twenty-five feet above the ground, while two more anchored it to nearby stumps. The threads of the web were as tough and sinewy as tiny leather thongs, and formed a complex net of clinging stickiness.

Plunging through the pine forest with boisterous speed, a full-grown June bug had opened a hole in the web. The sticky threads had yielded reluctantly, and the June bug had fallen into the lower mesh of the web. There he struggled desperately, every movement entangling him more securely.

High above this hopeless struggle a large spider, a member of the Nephila family, swung easily in the breeze. Its body was three-quarters of an inch long, and nearly the size of a lead pencil. The legs, fully an inch in length, were spotted and hairy. The jaws of the spider worked expectantly as it waited patiently for the dew to dry, apparently little fearing that its victim might escape.

The sun rose higher in the sky, and one by one the sparkling jewel-drops melted into the warming air. With their disappearance, the spider crawled slowly toward the infuriated insect, and the tragedy in the web was nearing a climax. Pausing beside the prisoner, the spider surveyed the situation momentarily, as if contemplating the method of attack. Then, one long rear leg touched the insect and turned it gently. Then another leg continued the rotation, very slowly at first. With increasing speed, the two rear legs alternated to keep the body revolving. With each turn one more thread bound the victim, like the filling bobbin of a sewing machine.

This steady rotation continued for more than an hour. Each thread wrapped the captive tighter and with each thread its struggles grew weaker. As layer piled upon layer, the June bug slowly disappeared under the whiteness of knitted fabric.

Finally the entire body was covered. Only the black head was visible, and the June bug's struggles had completely ceased. The spider had done a thorough job; it was only necessary to sever the head and leisurely suck the edible, living substance within.

It is one of nature's laws that some of her subjects must live at the expense of others, and that life shall be given to sustain life. It is also natural that the one who takes life must be merciless, while on the other hand, the inoffensive and less cannibalistic beings should be weak and timid and engender sympathy.

Perhaps it was against Nature's laws to take from that victorious spider the meal so carefully planned and earned, and perhaps it was merely giving the reckless June bug another chance which would again plunge him headlong into a waiting snare. Aside from any such satisfaction which might be derived from liberating the helpless bug and cheating the spider from a meal, I was, frankly, curious. Taking the mummy from the web, I began to work for the freedom of the body within. The incasement was hard and smooth as glass. A knife blade had little effect, one thread would yield, but a number of threads together would not break. There

were, however, no single threads; all were knit together as one.

By gently prying and pushing I managed to roll the shroud of silk backward to clear the front legs. From that point the prisoner began to assist by holding to a twig and pulling valiantly while I continued to roll the shell backward. After some time the June bug emerged victorious and flew away, leaving behind the silky raiment of death.

A Moon Bow

By E. E. Harwood

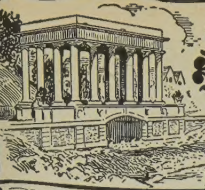
A "moon bow" that was visible at Calexico, California, a week ago may be of interest to your readers. On the evening of April 3, 1936, I noticed for the first time in my life a "moon bow." A thin band of clouds in the southeast approached the moon and as they did so the colors of the rainbow began to show. The moon being nearly full and very bright, as it always is here on the desert, gave the "moon bow" as much intensity as is usually seen in the rainbow in the daytime. As the clouds covered the moon, the bands of color formed in complete concentric circles with the moon forming, or being within, the red center. All the seven colors were very plain. It looked like some glorious target for the archer of the sky. It was visible for about a half-hour, beginning just after seven o'clock. It is my impression that the clouds were frozen; there was a flakiness of appearance and some stratification.

Poems by Rachel Field

"Only out of America could these poems have come. One feels the stir of leafy rains; the tide's insistent sound; the throbbing guttural of frogs; and sees the blue of hare-bells, red berries by a wood, and spruce boughs in October Sun". Miss Field writes most of country, and outdoors and seasons, and weathers, but also of cities and brown-stone fronts in *Fear is the Thorn*. One does not wish to put down the book, even when it is finished. It is published by the Macmillan Company, and if such values can be stated in money is worth much more than \$1.35. E. A. P.

Sea to Land

A learned treatise on the evolution of sea life to plant and animal life of the land, published by the Duke University Press, has been written by A. S. Pearse. A glance at the list of acknowledgments in the front of the volume will give the reader an idea of the vast amount of research and study that was necessary before a single word could be written. The author's travels in quest of data took him to China, Japan, India, Nigeria and other remote places where he was aided both by native and American biological experts. Mr. Pearse, admitting that the origin of life remains a mystery, considers the sea as the original home of life, and takes up in detail the routes taken from sea to land by the earliest forms of life. Although containing but five chapters, the book is intensive in its study of the causes of these sea-to-land migrations, the changes wrought thereby and the attainments of the land animals. An extensive bibliography is given. The price is \$3.00.



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Elephant Intelligence

"Elephant Secrets," by Clarence M. Weed, published in the February number, brought the following comment from Mr. O. L. Renner of Rush Center, Kansas.

"As regards the peculiar actions of elephants when their suspicions are aroused, and the suggestion of Martin Johnson that they were practicing telepathy, let me offer these observations. Being handicapped throughout my life by subnormal hearing, and now quite deaf, I am compelled to use my reasoning powers in all my problems. I often use the sound box principle in cupping my hand behind my ear, the only one that is of any use to me. The average person scarcely realizes just what happens through this method. It not only amplifies the sound, but changes the tone. Would it not seem

reasonable that, when the elephants gather together in a huddle, their ears when focused together might, through collective resonance, amplify some faint sound? Their suspicions may be aroused by the absence of some sound or something that should be there. A flying insect may carry the odor of man against the wind, for I know that insects do carry odors, and poisons too, from plants. If Martin Johnson or his leading man, when conducting a company through the jungle, should become suspicious that some place might conceal some dangerous thing, that place would be approached with extreme caution. Apparently mysterious actions of animals, when they are understood, are often found to be based on common sense. Those elephants were hunting for trouble, so they could avoid it."

Snakes Did the Job; Then Resigned

Thursday Island, off the Cape York finger of northeastern Australia, was, until recently, a tropical, palm-girt spot on the map "where every prospect pleases and only rats are vile."

These rats have lately been a perfect pest, especially to the shipping company which owns the wharf and its store. Cats were taken on the staff and were paid 84c a week in catsmeat currency. They did almost Hamelin service, but not quite, according to the Australian Press Bureau.

Then two large carpet snakes were appointed with board, lodging and other emoluments. By day they slept in the rafters of the store; by night they worked.

In an incredibly short time every rat disappeared. Now, also, have the snakes.

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BELL TELEPHONE SYSTEM



In July, Alexander Wilson

ON July 2, 1805, a schoolmaster near Philadelphia wrote to the famous botanist, William Bartram: "I dare say you will smile at my presumption, when I tell you that I have seriously begun to make a collection of drawings of the birds to be found in Pennsylvania, or that occasionally pass through. . . I have resigned every other amusement, except reading and fiddling, for this design, which I shall not give up without making a fair trial." The writer was Alexander Wilson, father of American ornithology, for whom Wilson's thrush and other birds are named. Thirty-nine years before, he had been born in Paisley, Scotland, on July 6, 1766. Eleven years before, on July 11, 1794, he had landed in this country, at Newcastle, in Delaware. In another July, in 1813, only eight years after he had anticipated smiles at his presumption, he wrote: "My eighth volume is now in the press and will be published in November. One more volume will complete the whole." Volume nine of *American Ornithology*, however, was finished from fragments by Wilson's friend, George Ord, for Wilson, weakened by constant application to the preparation of these books, succumbed to an attack of dysentery on the following August 23, 1813.

Readers who find quaint pleasures in what may seem merely chance coincidents to others may take with some delight the suggestion that the associations of Wilson with dates in July invite an evening or two of browsing in his work during this month. In his first July in the New World, Wilson, though no naturalist at that time, remarked on the birds and flowers he encountered, and Ord tells that in a conversation Wilson once described his sensations then "on viewing the first bird that presented itself as he entered the forests of Delaware. It was a red-headed woodpecker, which he shot, and considered the most beautiful bird he had ever beheld." Searching for descriptions of July bird observations will by no means tempt one from the outdoors on a pleasant day, but when rain or heat makes of the house a refuge, one can find that Wilson has collected much of the outdoors within these volumes, with his own colored plates. "This work," he wrote, "is not intended to be a mere compilation from books, but a transcript from living Nature." And in a presidential campaign year it may be of some tonic value to recall Wilson's "wish to draw the attention of my fellow-citizens, occasionally, from the discordant jarrings of politics, to a contemplation of the grandeur, harmony, and wonderful variety of Nature."

The topmost figure of the first volume's plate 1 is the American goldfinch, the late-nesting bird of July fields and gardens, with its flight, in Wilson's words, "not direct, but in alternate risings and sinkings, twittering as they fly, at each successive impulse of the wings." It is pleasant, says our author, "to observe a few of them at

work on a calm day, detaching the thistle down in search of the seeds, making it fly in clouds around them."

Another bird pictured on the same plate is the Baltimore oriole, Wilson's discussion including the following: "Since the streets of our cities have been planted with that beautiful and stately tree, the Lombardy poplar, these birds are our constant visitors during the early part of summer; and amid the noise and tumult of coaches, drays, wheelbarrows, and the din of the multitude, they are heard chanting 'their native wood notes wild'; sometimes too within a few yards of an oysterman, who stands bellowing, with the lungs of a Stentor."

Here is another encouragement for July: "Some of our birds sing only in spring, and then chiefly in the morning, being comparatively mute during the heat of noon; but the Indigo-bird chants with as much animation under the meridian sun, in the month of July, as in the month of May." And another item for the Nature calendar is in Wilson's description of the cedar waxwings that "collect together in flocks, and retire to the hilly parts of the state, the Blue Mountains and other collateral ridges of the Alleghany, to enjoy the fruit of the *Vaccinium uliginosum*, whortleberries."

In a sketch of Wilson's life included in volume nine of *American Ornithology*, Ord says that Wilson had expressed a wish that he might be buried in some rural spot sacred to peace and solitude, where the charm of Nature might invite the steps of the poet and the lover of science and where the birds might sing over his grave. Not in a rural spot but in an oasis amongst acres of old dwellings along the busy and noisy waterfront of a modern metropolis, Wilson's remains rest in the churchyard of the oldest church in Philadelphia, the Gloria Dei (Old Swedes') Church, beneath a horizontal slab of stone with a brief epitaph that calls him simply "Author of American Ornithology." A Norway maple with a bird box hanging from one of its branches throws shade on the grave, and, about the stone, violets and shrubs of yew are growing. The upkeep of the grave, supported in part by the Delaware Valley Ornithological Club and the Pennsylvania Audubon Society, is under the sympathetic direction of the Rev. John Craig Roak, rector, who cares for the memory of Wilson and whose plans for the churchyard include plantings to attract the birds that Wilson wished to sing over his grave. On Palm Sunday, April 5, 1936, the rector made an occasion of the improvement of the grave, and at his invitation Dr. Witmer Stone, Wilson scholar and dean of the ornithologists of our own day, told the congregation of Wilson's life and work, describing him as a "poet-naturalist, ever modest and retiring, content with the pleasure derived from his study and worship of Nature and in the satisfaction of work well done."

—By HOWARD ZAHNISER.



TRIGGER FISH AMONG THE CORALS

Beautifully colored, these three larger fish
swim majestically among smaller tropicals

From an original painting by Elie Cheverlange

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Birds of Chinese Tradition

A glance into the mythology of the Far East

By JOHN W. MALONEY

Photographs Courtesy Freer Gallery of Art

NO LANGUAGE is more thickly interspersed with picturesque phrases and gusty comparisons than the Chinese. It is often and quite correctly said that one can never understand the people of Cathay without an insight into the language of the country, the common dialects of the working classes as well as the formal Mandarin spoken in official and well-to-do circles. To a lover of Nature the delight in studying the odd-sounding word system is doubly heightened by the discovery, before one has gone far into the intricacies of the characters and their sounds, that the spoken and written word in the Far East sprang from the primeval awe the early sages and philosophers, who first attempted to put their thoughts and desires into pictures or words, felt toward all things natural about them.

At a dinner of congratulation, when a young Chinese friend of mine received an appointment to an important government post, a stately old gentleman beautifully expressed his good wishes: "May you soar as the roc to a height of ten thousand *li*!" Chinese classics are filled with such quaint

expressions, accessories of speech that are still used in the everyday language of the peasant-coolie as well as the merchant prince and the scholar.

Interwoven into all the traditions of the country, and into many of the customs still existing today, are relics of by-gone dynasties and ages when the worship of Nature in the heavens, the seas, and on land played a most important part in both the spiritual and the practical life of the Chinese. It is difficult to find treasured tapestries or early paintings that do not have about them some demonstration of this regard for the beauties of Nature. The most valued works of ancient art in the Imperial collection in Peiping are those century-old paintings of flowers, sacred members of the animal kingdom, or mythical creations that were held invaluable in the practise of agriculture, science, or literature. A study of birds in the traditions of that country reveals a host of interesting facts.

The crane (properly, the heron) occupies an eminent position in Chinese mythology as well as the traditions of



TWELFTH CENTURY CHINESE ART

Two doves on a flowering branch, a painting in color from the Sung dynasty

these lovable people. It is the same with all Oriental peoples; Japanese, Koreans, Siamese, even Malaysians place this bird on a lofty pedestal by generally associating it with the immortals. One of the most beautiful stories in Chinese folklore, in many versions that one may find in scattered sections of the country, tells of a hermit who lived in seclusion, and, through many years of study, obtained the secret of immortality. His final triumph came on the day when, his greatness recognized by the gods, he was privileged to be carried into Heaven on the back of a crane.

There are two species of large herons in China, a more or less rare white one, and a common gray one. In all the stories that I was able to find concerning these royal birds, the gray one is mentioned once compared to the twelve stories found concerning the white species. Quite likely there are scores of other stories concerning these birds of which I know nothing. But one of the greatest masterpieces of Chinese prose that I have found is "The Chalet of Cranes" by Su Tung-po, famous classic scholar and essayist.

Several years ago Herbert Giles translated this beautiful poem by Pu Sung-ling:

In pleasant company the hours
fly fast,
And through the window day-
light peeps at last;
Ah, would that, like the swallow
and his mate,
To live together were our happy
fate!

There exists in Chinese literature no more fitting means of signifying family love and endearment than by mentioning the companionship tradition credits to the male and female swallow. Some of the folk-songs of old Peking and Shantung picture a young wife lamenting the loss of her mate at each fresh sight of the swallows flying about the country in pairs. Han Kuoping, in his collection of folk classics, tells of the reconciliatory powers of a pair of swallows that brought about a settlement of difficulties between a young Northern prince and his estranged wife.

It is doubtful that western influence had anything to do with the respectful manner in which Chinese tradition treats the cock. These militant birds supposedly possess the five virtues of honor, martial ardor, bravery, benevolence, and punctuality. In a story dating from the time

of Confucius an account is given of a flock of cocks throwing confusion into the ranks of a band of robbers who were storming a magistrate's household at break of day. This story brought to my mind another, and to the Western world a more familiar, fairytale in which the cock plays such an important part—the old German story of the four friends of Bremen. And just as we credit the punctuality of this barnyard prince, the crow of the cock at daybreak is also considered a perfect timepiece by the Chinese.

The phoenix, called in Chinese *feng huang*, is one of the four sacred creatures of the country, the others being the dragon (perhaps the most important of them all), the tortoise, and the unicorn. The unicorn is recognized as the king of the quadruped world, the phoenix, ruler of all feathered life. There was, I believe, a closely similar tradition among the Egyptians that the phoenix came to earth only once in a thousand years; the Chinese early had the belief that this rare appearance heralded the birth of a great sage. Many are the versions of stories concerning the appearance of a beautiful phoenix in front of the Imperial palace foretelling the birth of Confucius. This bird is also esteemed for its affection of lasting quality. From that attributed characteristic comes the oft-used expression of congratulation to a newly-married couple: "May you be as happy as the phoenix."

The old empress dowager, Tsu Hsi, was especially fond of the phoenix, and even today there remains, standing in front of her office building in the grounds of the Summer Palace near Peiping, four beautiful examples of the phoenix in bronze, acting as guardians

of her throne. Other examples are found in the Forbidden City, and in countless pieces of tapestry woven for this peculiar old lady. Still earlier accounts of the mythical bird are by the Polos, father and son, in telling of the courts of the great Khan.

While that most important domestic fowl, the duck, has no especially noteworthy place in tradition or folklore, one interesting story is retold by C. S. Wang that gives it a place in this list.

The legend unearthed by Mr. Wang has it that when the famous General Li Su besieged the city of T'sai with



WHITE CRANES AND A WILLOW TREE

A painting in ink and color attributed to Lü Chi, a famous artist of the Ming dynasty, fifteenth century

his picked troops, he found that the place was so efficiently defended on all sides that he had to resort to curious expedients. In the daytime he beat a retreat to an out-of-the-way spot, and at midnight returned to the city walls secretly. But because of the numbers of his troops, the tramp of their feet could not be kept from the straining ears of the sentinels keeping watch in their towers.

Close by the city was a pond where a large number of ducks were being raised for the markets. The resourceful commander ordered a squad of his men to advance and wade in among the ducks, thereby setting up a great clattering among them. The noise then effectively covered the sounds of the marching troops, and even the thud of the horses' feet, so that a surprise attack was possible with the result that the city capitulated. Success was laid directly to the ducks. Thereafter, concludes the tale, General Li Su allowed no more ducks to be served at his table, however fond he was of their delicious meat!

One exception to the general disregard of the duck family in Chinese tradition is the mandarin duck, who is by some believed to be representative of nuptial love. For this reason, it is very common to see mandarins embroidered on pillow covers, bed coverlets, and bridal gowns on wedding days.

The crow is considered in Cathay to be a bird of exceedingly evil omen, and its presence is disliked by all Chinese. A Mongol prince told me at Pai-ling-mao that a crow was the indirect cause of his father's death, so that to him its evil powers were demonstrated beyond doubt. It seems that while crossing a range of mountains in the neighborhood of Kalgan, a Mongol pony that his father was riding suddenly shied when a crow flew up from the road, throwing the old man into a cairn of rocks by the roadside, and killing him instantly.

"Sorrow flies with the crow," another Chinese said to me once, and I have heard the same belief expressed in many sections of the country.

The western picture of the owl as a wise old fellow with spectacles balanced on his beak would be laughed to scorn by the Chinese. To them he is an abominable creature, and in their cursing language, a considerable collection of words that spring directly from the soil, to be called an owl is to be labeled a greedy, despicable, even blood-thirsty person. This comes from the popular supposition that the owl devours its parents once it is grown, and such a belief is perpetuated by frequent mention in the ancient literature of the country. On the other hand, a small bird that comes in for frequent notice, the wag-tail, is greatly loved, and is often pointed out as a perfect example of brotherly love and fidelity. The phrase "wag-tails over the plain" signifies the ability of brothers to live together harmoniously.

One of the most fascinating of ancient legends has to do with that very common, and often very annoying Chinese bird, the magpie. Although so far as legend and folklore are concerned, it is not an important bird in itself, still it is immortalized in a much-loved story as a sort of go-between for the popular mythological weaving



MANDARIN DUCKS

Painted on silk in a setting of hollyhocks and tiger lilies. Ming dynasty, sixteenth century

maid and the handsome cowherd who are supposed to meet for a brief period annually on the evening of the seventh day of the seventh moon. The delightful account comes from the *Annals of Chu and Chin*, a literary work highly appreciated by all Chinese lovers of the classics.

This weaving maid is the daughter of the supreme god of Heaven. Before her marriage to the celestial cowherd she was accustomed to sit on the east bank of the Heavenly River weaving, singing sweetly as she concentrated on intricate patterns. After her wooing and subsequent marriage she moved her looms to the other side of the river, but soon began to neglect her work to sit watching her husband. Her powerful father became angry at her negligence, ordering her to return home, and thereafter to meet her lover only on one day each year.

So, on this seventh day of the seventh moon, the twit-



CHINESE PORCELAIN

An antique wine cup dating from the Yung Cheng period, early eighteenth century

terings of the magpies may be heard over the countryside, congregating by the banks of the river. When the pretty weaving maid is ready to join her husband, the magpies gather over the milky way, forming a bridge on which the two lovers can sigh their brief murmurs of love, only to part again on the morrow for another long year.

Watching them and studying their language, I have come to the belief that the Chinese are the world's greatest lovers of birds. Pet shops are almost as frequently encountered in Chinese towns and cities as filling stations in America. Having a songster of some kind to take out for an airing on pleasant days fits in with the Chinese grandfather's retirement plans as perfectly as do our de-

sires for a pipe, a quiet corner, and the companionship of a good book. Tourists in Shanghai find it an interesting and appealing sight to walk around the international race track in the heart of the International City, watching dignified old gentlemen "sunning" their nightingales, larks, thrushes, and other types of birds that these people, through their care and understanding, have to a very remarkable degree succeeded in breeding indoors.

Hangchow, with its beautiful lake front, is another famous promenade for bird-lovers with their artistically designed cages. Legendary history even records the fact that one of the famous Hangchow poets adopted a stork as his son, and, not to be outdone in poetic romance, took plum blossoms as his wife. I like to believe the frequently encountered story that the old empress dowager was such a bird lover that she rearranged the palace rooms in the Forbidden City in order to prevent the birds from being bored with one monotonous view from a window, even going so far as to have whole palace walls taken out so that the cages would look out on beautiful lotus-covered lakes and flower gardens.

Nature is close to the life of every Chinese, and all the feathered folk that go to make up the finishing touches for the charm of the out-of-doors are held in high regard by the laborer, the student, the water-shop keeper. More than mere incidents in the complete scheme of all things natural and of the earth, they were long ago given a rank of high importance in Chinese literature, art, and science. Perhaps, too, that is the secret of the abundance of bird life in China, in spite of the fact that the country has suffered periodic cycles of famine and scarcity since the dawn of history. Evidently this love has been so sincere that the birds have been preserved.

A Flowery Home

THIS cactus wren pair had an eye for beauty when they chose the site for their nest-home in almost the exact center of the flower-stalk of a Spanish bayonet or *Yucca whipplei*. It was an unusual location for a cactus wren to choose because practically always they appear to prefer a plant that is armored with thorns; a Bigelow cholla cactus preferably, or sometimes the palo verde tree, which brandishes slim but effective thorns.

It was a unique nest in another respect also. It was a solitary nest with no "roosting or spare nest" in proximity. Construction of such a second abode is a custom from which the cactus wren seldom deviates. Almost always two



By GENEVRA COWAN

flask-shaped nests will be found on the same plant. Ornithologists have ascertained that the male bird sleeps in the extra nest, which is never as substantially built as the nest proper.

The cactus wren is the State bird of Arizona, but is quite abundant in the desert lands of southwestern United States. The birds eat injurious insects and weed seeds.

When the cactus wren sings he throws his head back, droops his tail and abandons himself to his musical theme. It is truly a song of the waste places—insistent, with little variation, it expresses the constant brilliance of light and the bristling character of his surroundings.



THE VENUS FLYTRAP, *DIONAEA MUSCIPULA*, IN ACTION

The center leaf of this carnivorous plant has just closed on an unsuspecting grasshopper, whose hind legs can be seen protruding from the leaf. Photograph courtesy University of North Carolina Press; *The Natural Gardens of North Carolina*, by B. W. Wells

The Venus Flytrap

By E. V. DEANS, JR.

IN THE coast region of North and South Carolina lives a strange, well-disciplined plant—the most wonderful in the world, said Darwin, who experimented with it in numberless ways, and wrote hundreds of pages on its actions. In early June one can see the white flowers of this plant above the grasses of the bogland, in company with blueberries, blazing stars, and pyxie flowers.

Ever watching for these white flowers, George and I made our way across the bog. It was a bright day; a fresh wind came from the sea, and everywhere was the smell of warm pines.

While we walked I tried to explain to my companion that many people thought of plants as living an independent life, making their own food, as do the longleaf pines around us, or living on other plants, either dead or alive. As an example, I had no trouble in finding a mushroom growing on a decaying log. However, a more remarkable group of plants existed, I told him, that get a part of their food by eating insects.

"Cannibals", he said.

"Well, cannibals in the sense that they eat animal food, but not that they eat their own kind. Better to call them insect murderers who trick their victims in traps with teeth, and then devour them." George looked doubtful.

Gradually the stream we followed became only a wet sandy ditch bordered with tall grasses and canes. Breaking through these, we came upon *Dionaea*, the Venus flytrap. Above the grass it raised its simple white flowers.

Taking a blade of grass, I told George to stroke one of the leaves. He did so—twice. The leaf closed at once. He was astonished, and repeated the action several times.

"That's what happens when a fly touches the leaf. Look here."

I cut off a leaf. It was of two lobes, each resembling the half of a huge butter bean. All along the outer margin of each lobe were stout teeth, which interlock when the trap is shut, for the leaf is the trap. On the inside of each lobe were three sensitive hairs—the "triggers" that sprung the trap. Curiously enough, a hair must be stroked twice before the leaf will close. The plant is not to be fooled by any chance particle of inanimate matter that happens along. Only the live, the crawling, the struggling insects that strike the hairs twice are the victims. Over the inside surface, in addition to the trigger hairs, were purple dots and tiny hairs. These were the glands from which digestive juices are secreted to assimilate the insects.

When a fly alights on the leaf, it immediately touches one of the trigger hairs, which sets the trap off at once.

Nor can the fly escape. The stout teeth interlock over him, creating a horrible prison and promising sure death. At the touch of "wet meat" the glandular surfaces begin to secrete an acid liquid that covers the victim. If the victim struggles, the plant only closes its leaves more tightly and pours forth more abundantly the "ropy" secretion. The closed leaf, or trap, now serves the same duties as a stomach. The digestive juices come in great quantities, dissolving the tender, fleshy parts so that they can be absorbed by the leaf and used as food. We found a closed leaf, opened it, and were surprised to find a small spider, half digested.

When all the fleshy parts are dissolved and absorbed by the leaf for food, the leaf opens and is ready for another meal—just as our stomach prepares for another meal. However, one leaf rarely eats more than once.

Using our hands as cups, we brought water from the stream and poured this water into the leaf trap. The leaf gave no signs of closing. We blew upon the leaves, but they remained unconcerned. I told George to focus the sun on the leaves with his magnifying glass. The heat had no effect. To rains, to winds and heat these sensitive leaves stand indifferent. As will human beings so will the leaves of *Dionaea* close or go to sleep under the influence of chloroform. An overdose of the vapor will bring death. George was, by now, thoroughly fascinated.

"But why do these plants eat insects, anyway?"

"Fancifully, the motive of the Venus flytrap may be this: It is well known that animals eat plants. A few queer plants, seeking to avenge the eating of their kindred plants by animals, resort to eating insects. But more seriously: Insects furnish an abundant supply of nitrogen, which is very valuable as a food. However, nitrogen is also in the soil in which this plant is growing. Thus the plant may live without the insect food. And yet it is true that only materials containing nitrogen will bring about this secretion of juices so necessary for digestion. Glass, wood, and paper will not."

The plant lives primarily in the boglands within about seventy miles of Wilmington, North Carolina. But it has been found on the banks of a lake some hundred miles to the north, at Goldsboro, and also at Washington. Others report that *Dionaea* lives as far as a hundred and fifty miles west from the coast, and southward into South Carolina. The plant is in no danger of extinction, even though Darwin said it was one of the rarest in the world. So abundant are they in some of our eastern bogs that one can hardly walk without stepping on them, just as we found them.

But George was showing me the remains of flies, beetles, caterpillars, spiders, and a few large ants, not yet fully digested—all victims of *Dionaea*. He was convinced.

One Of Our Best Friends

By S. F. AARON

CONSIDERING the birds, the bats, the insect parasites of insects, the skunk, the opossum, the smaller reptiles and the batrachians in comparison with the shrew as destroyers of insect pests, the latter, the smallest of quadrupeds, little larger than the smallest song birds and larger insects, will prove to be the champion in this good work.

Many of the birds get only the winged species, others get only the larval and pupal forms; some few get both. For the most part the quadrupeds, and the toads, the snakes and lizards of restricted distribution, capture only the more lethargic insects and these in the warmer seasons. But the courageous, swift, commonly unseen and mouse-like insectivore, ever hungry and on the alert throughout the year and day and night, gets everything: the winged species at rest or when inactive from lowered temperature, the runners and jumpers and diggers; the larval forms in and above ground, in woodland, field and garden, on the mountaintops or beside the lowland river, in sandy arid stretches or in marshland.

It has been said, and the estimate cannot be far from correct, that the shrews, both the short-tailed and the tinier long-tailed species, are the commonest of all warm-blooded creatures, not omitting even the most plentiful of birds. Yet how little we know about them. They are the color of shadows and in the shadows they remain, ex-

cept from time to time when by fatal mistake they pop up through a hole in the snow crust and are easily captured by owl, hawk, cat or weasel. In pursuit of some light-seeking prey they may come atop the fallen woodland leaves, or sometimes in summer they dare to dash across a short stretch of barren ground.

Savage are the shrews, more eager for blood-letting than the weasel or mink, and far more brave. If lions, tigers, pumas, wolves were as fearless and courageous there

would be no human species to-day on earth. But the shrew's continual love of satiation is to man's great advantage, the vegetation-destroying insects being made vastly less in numbers thanks to a most remarkable appetite.



SHORT-TAILED SHREW ABOUT TO DINE ON A GRASSHOPPER

Underground Owls

By HUGO H. SCHRODER

Illustrations by the author

DRIVING over the Kissimmee Prairie in the early morning of a spring day, we discovered a male Florida burrowing owl on a mound of sand, not far from the winding prairie trail. When we shut off the motor, Mrs. Owl appeared from the depths of the earth to join her mate at the nest entrance.

I walked slowly toward the pair of tunnel dwellers to try for a closeup portrait of family life at an owl home site. Both owls started a curious bobbing curtsy, as though they were extending a friendly greeting of welcome to the human intruders. The bowing continued until the owls decided that I had overstepped the limits of safety. The male was the first to leave the hillock. Uttering a tremulous call, he launched in a low, undulating flight, landing on the ground some distance from the nest. The female was more intrepid and stood her ground while I approached a few paces nearer, but soon she, too, left the nest site, coming to rest on a scrub palmetto about 50 feet from the nest entrance.

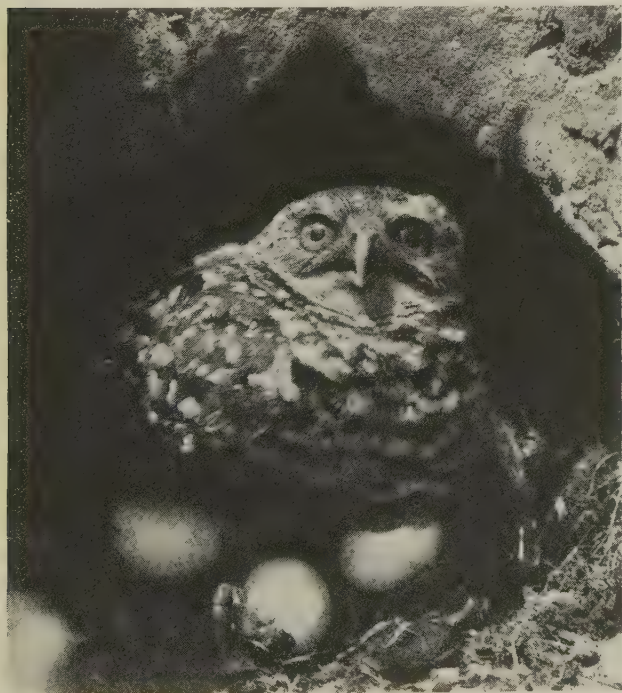
When the sandy mound was reached, evidences of an occupied nest were to be seen. Small bits of dried cow dung were present at the burrow opening and in the tunnel leading to the nest chamber. This material is used as a nest lining, together with grass roots and matted bits of cow hair. Many beetle wings and pieces of crawfish shells were scattered around the ground, testimony that there was no food shortage in the owls' hunting grounds.

Both my companion and I were much interested in obtaining a series of photographs illustrating the life history of these quaint underground dwellers. When all the eggs have been laid and incubation begins, the female owl frequently will stay in the burrow, instead of leaving at



FINE FEATHERS

An interesting photograph of the Florida burrowing owl, showing well the markings on both wings and body



the approach of intruders. Having witnessed the departure of the female soon after our arrival, we concluded that the nest did not have its full complement of eggs. Therefore, we postponed trying to photograph this nest until some later date, when we hoped to find the female in her underground home, busy with the duties of incubation.

The Kissimmee Prairie has a variety of interesting bird life, so we spent a number of days wandering around in search of other likely subjects. Visits were made to several colonies of American egrets. One of these colonies has occupied a cypress swamp at the edge of the prairie for a number of years and here we saw more than a hundred nesting pairs of the beautiful snow-white plume birds. They were known as "long whites" by the plume hunters of the past. Nests of the larger Ward's herons were found close to those of the egrets. Some of the nests contained eggs, while many were occupied by young birds of various sizes. The young egrets and herons kept up an incessant calling, and the harsh croaks of the parent birds were not in keeping with the beauty of their plumage. Photographic efforts in the egret rookery, as well as with the Florida crane, Audubon's caracara and other prairie nesting birds kept us busy until we decided to go back to the owls and to see how their family was faring.

MADAME OWL GUARDS HER NEST

When all the eggs have been laid, the female owl frequently refuses to leave her nest at the approach of intruders



BURROWING OWL QUINTUPLETS

Returning to the nest six weeks later, we found the family had increased from two to seven

On returning to the nesting site, we found Mr. Owl bowing in a friendly manner, but his mate did not appear. Carefully removing the sandy soil covering the tunnel, we discovered that it was not dug in a straight line, but curved decidedly to the right. About 5 feet from the entrance the tunnel terminated in an enlarged chamber and here we found the female covering her 6 white eggs. She did not offer any great resistance to being removed from the nest. Looking at us with her big yellow eyes, she seemed to sense that we had no intention of harming her. Several pictures of the captive bird were taken, and at each release of the camera shutter, she uttered a faint note of protest.

Our cameras were set up on their tripods and adjusted in anticipation of recording some intimate home portraits of Madame Owl. When returned to her home, she obligingly posed while crouched back of the eggs and, later, covering the eggs.

After photographing the bird at her incubating duties, we laid a number of stakes across the top of the tunnel, and covered them with pieces of tin. This was covered with packed sod to protect the burrow from the elements. So far our efforts at photographing the dwellers of the darkness had been successful. So we packed up cameras and tripods, while expressing the hope that this pair of owls would succeed in raising a fine family of youngsters.

More than six weeks later we returned to the nest. Both old birds were observed in the neighborhood. When our improvised roofing was removed from the tunnel, we discovered that the owls had not approved of our efforts in their behalf. The type of roof was not according to the best owl architecture, so they excavated about five feet back from the original nest chamber. This tunnel also was built with a curve and at the end five young owls blinked at the bright morning light. The youngsters were almost full grown, yet they offered no objection to posing for a group portrait. They allowed us to handle them without any effort to escape. Several times they snapped their beaks

in a feeble protest but they did not bite or scratch. We have never encountered better behaved bird youngsters. When posed on a tussock of grass, they stayed where they were put and seemed to enjoy having their pictures taken as much as the photographers enjoyed their cooperation.

While the five youngsters were posing for group portraits, Papa and Mamma Owl flew by several times at close range, uttering their quavering calls. The youngsters seemed to pay little attention to the actions or calls of their parents. In that respect they were quite different from most bird children we have tried to photograph. It was quite a relief to us to have such amiable subjects.

Storm clouds were gathering in the distance, so we halted our picture taking and again covered the nest tunnel as we had done on our previous visit. We had barely finished making the owl home rainproof when the shower started and we had to run to the car to protect our photographic equipment from the downpour. Thus ended our first attempt to photograph the burrowing owl from eggs to grownup youngsters.

The Florida burrowing owl is a permanent resident of the Kissimmee Prairie and other prairie regions of central and south Florida. It is found from Lake Tohopekaligo, in Osceola County, south to Lake Okeechobee and west to the gulf coast. A small number of birds reside in other parts of the state.

These interesting little owls live in small scattered colonies, mostly in the prairie regions where human neighbors are not very numerous. Some years ago several families nested in a boom time sub-division in Ft. Myers. One of these succeeded in raising a family of 3 youngsters in a burrow at the side of a graded street, within 15 feet of a water hydrant. In the prairie regions, the male owl keeps watch at the nest mound during the incubating season. At this urban nest site, the male used the hydrant as an added lookout station. By stalking Mr. Owl, I got his portrait at the hydrant, on a nearby stump, and perched on the chimney of an unoccupied house across the street.

A majority of the burrows I have seen were dug by the owls, although burrows of the gopher tortoise are appropriated by some owl families. When owls do their excavating they seem to prefer the more open grassy areas, away from scrub palmettoes. Nests near the palmettoes are usually abandoned burrows of the tortoise. With his shovel-like front flippers the gopher tortoise can dig among the palmetto roots without much difficulty.

Owl tunnels, frequently curved, may extend underground for distances of 4 to 9 feet, the nest chamber being 6 or more inches below the surface; if tortoise burrows are used they may be from one to two feet underground. The nesting season begins in March, and four to seven eggs are laid. The birds' food habits are beneficial, since they feed chiefly on insects, especially several species

of beetles, and also on crawfish. The male owl spends much time during the daylight hours performing sentry duty at the nest entrance. Usually he is the first to leave when visitors approach the home site; also, he is the last to return. The female ventures back first and returns to her underground household duties, but her more cautious husband waits until she has scurried into the burrow before he returns to the lookout station. We have caught several in the nest burrow and only once has a captive bird attempted to bite, and the resulting nip was a rather half-hearted effort. None of the birds have used their talons as a weapon of defense. A low quavering call is frequently uttered by the owls when their nest is approached. Once

a captive bird uttered a single scream. Similar screaming notes heard infrequently at night, when we were camping on the prairie, presumably were calls of these owls. Their flight is usually near the ground, seldom being over 10 feet up and is of an undulating nature.

Man is the worst enemy of these inoffensive little creatures. The birds are of such a trusting nature that they provide easy prey for wanton killers. The building of roads through the prairie regions will contribute to the owls' destruction. Snakes of course take their toll of eggs and birds.

May this interesting subterranean dweller continue to be a resident of the Florida prairies for many generations.

"Shine, Little Glowworm" By PAUL GRISWOLD HOWES

How familiar are the words of this song, yet how few are the people who would recognize the curious creature that inspired them!

At the outset, the name glowworm is misleading, for who would set out to search for a beetle that bears such a lowly name? One would be more likely, in trying to find this creature, to examine all kinds of worms after dark and, in the eastern United States at least, this search would be quite futile.

A glowworm may be either the larva or the wingless female of certain species of fireflies. And here again the word firefly is all wrong, for the insect is a true beetle.

The illustrations show a common species of glowworm, found in August and early September, living on the ground in damp places among grasses or leaves, or along the edges of paths and roadways.

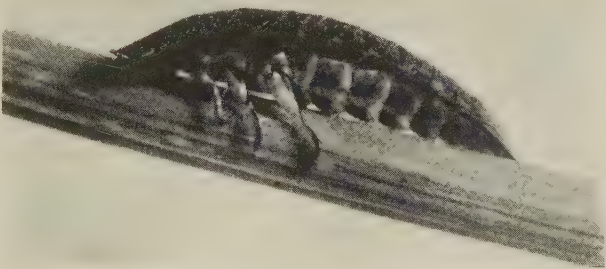
Its body is made up of many segments and to the uninitiated looks more like a crustacean than an insect, but closer observation will reveal its six legs and other insect characteristics.

Unlike many insects it may protrude its head some distance on a fleshy neck, or it may withdraw it out of sight, after the manner of a turtle. The female's light glows steadily, whereas that of the adult male flashes on and off. Both sexes are born from eggs upon bark or rotting wood and the larvae spend considerable time in this stage.



CRUSTACEAN OR INSECT?

The segments of the larval glowworm's body lead one to believe the creature is the former, but the six legs at once identify it as an insect. Both pictures enlarged four times



Curiously enough, some females never develop wings, but not all females of this family of insects are so doomed. Even the wingless species are quite active and predaceous and they have the habit of rolling into a ball when disturbed, much like a pill bug. This adds to the illusion that the creature in hand is a crustacean rather than an insect.

The luminous spots that these insects possess are believed to be portions of the fat-body, as it is called. These areas are fed by a large number of minute tracheal branches or aërating tubes. The cells of which the luminous spots are made up are chemical laboratories that secrete a substance which undergoes such rapid oxidation under the influence of the rich

oxygen supply, that light is emitted.

This light is perfect light. Man has produced various types of light artificially, but nothing so perfect as that of the glowworm and firefly. It is almost entirely devoid of heat rays and chemical rays, and therefore almost completely visible. The sun possesses a light giving efficiency of only thirty-five per cent. An arc light, ten per cent, and the common old gas flame about three.

It is obvious then that when man is able to produce the same type of light as the glowworm and on a large enough scale, he will have an all but perfect light that will be as revolutionary and far reaching in the changes which it will bring about as was the incandescent filament.

The Hyrax— What Is It?

By W. STUART CRAMER

IN A collection of some sixty-five small mammals that live happily in a low-roofed house in the Philadelphia Zoological Gardens are a number of spectacular and interesting forms that attract the eyes of all. There are the white-handed gibbons, which swing to and fro all day long, singing and playing tag, the beautiful ruffed lemur whose black and white fur and friendly disposition enthrall many visitors, and the South African porcupines, which bear a perpetual grudge, loudly stamping their feet, raising their sharp, pointed quills and rattling the hollow tubes that grow on their tails. Even the slow-moving sloth, who sleeps upside down all day, affords much amusement and is the subject of many arguments and discussions among the hundreds of visitors.

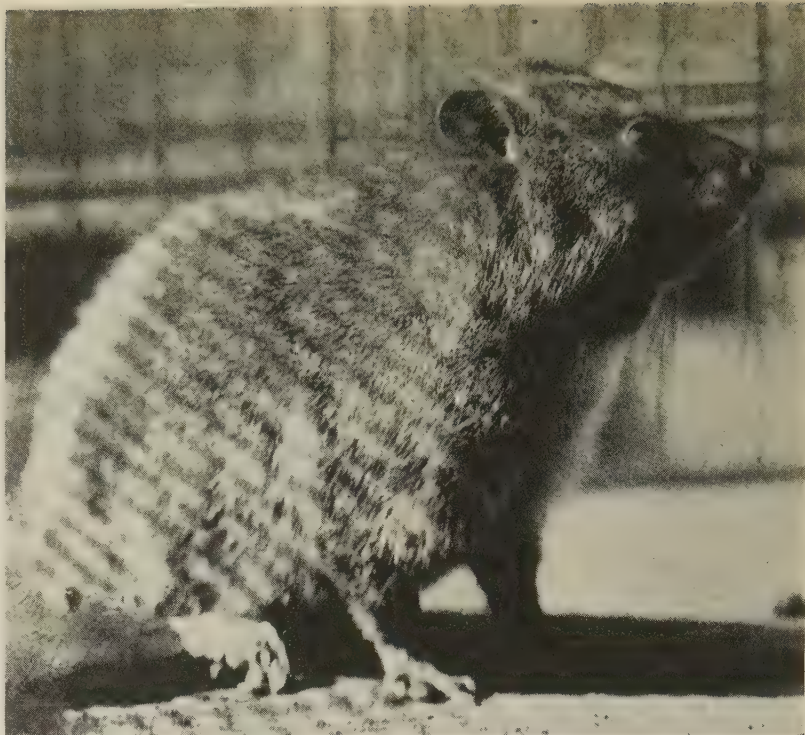
While these animals occupy the limelight, there are rare and less conspicuous ones, still just as interesting, and among these is the hyrax.

But what is the hyrax?

In a small cage not too prominently placed, yet not hidden from the eyes of the inquisitive, there lives a little furred beast, in size no larger than a rabbit, who sits upon a high board—stolid, unmoved—as if he too were wondering just what he really is. The label on his cage reads "Cape Hyrax or Coney." His scientific name is *Hyrax capensis*. He originally lived in South Africa, probably in some rock pile where he spent the day sleeping in the shade, and venturing out mornings and evenings to feed upon the leaves and young shoots of trees and shrubs.

An occasional visitor stops, reads the sign, looks once at what he probably thinks is a near relative of the guinea pig and passes on without comment. But the zoologist stands before this cage with more than mere curiosity detaining him. How well he realizes what a puzzle this little animal is! While it is rodent-like in appearance, with long front teeth and pointed muzzle, yet without the usual five toes and strong claws of all other members of the gnawing family, the coney anatomically resembles more closely the elephant and rhinoceros than any other species now living. This may be hard to believe, but let us observe closely.

The toe-nails are short and rounded, indeed like those of the huge pachyderms. On the front feet there are four toes, and on the hind feet, three; this also being the case



THE CAPE HYRAX OR CONEY

About the size of a rabbit and having the general appearance of the guinea pig, this peculiar creature anatomically resembles the elephant and the rhinoceros

with one of the species of elephants. The large front teeth, the incisors, which resemble at first glance the strong, gnawing teeth of the squirrels, are not flat and chisel-shaped, but instead are three-sided and pointed, more like the fangs of the great cats. These upper teeth grow throughout the animal's life as do the elephants' tusks, but the four lower ones stop growing when the animal reaches maturity. In structure the seven cheek teeth of each upper and lower jaw resemble those of the rhinoceros and its extinct relative, the palaeothere.

Among other peculiarities are the total absence of collar bones, and the unique arrangement of the hyoid apparatus. The last mentioned, the voice box, is unlike that of any other known mammal. Another feature is a rather large gland situated in the middle of the back, and which opens on the surface of the skin. This character is found also in the Central and South American peccaries. The color of the fur is nearly uniform brownish-gray, except for that surrounding the dorsal gland, and several subspecies are designated by the color of this patch of hair. The tail is reduced to a mere stump.

Hyraces are found in Africa, Arabia and Syria. The species that inhabits southwestern Asia, *Hyrax syriacus*, is the "coney" of the Bible: unclean "because he cheweth the cud but parteth not the hoof . . . The conies are but a feeble folk, yet make they their houses in the rocks". Most of the known species have similar habitat preferences, but three species of Africa inhabit trees almost entirely, taking refuge in holes in the limbs and trunks. There are usually only three young in a litter.

Because the hyrax is comparatively uncommon, and seldom survives for more than a few years in captivity, it is not often exhibited in zoological collections.



REALISTIC AS AN UNDERSEA PHOTOGRAPH

This sea anemone habitat group, prepared under the direction of Stanley T. Brooks, is the work of Frank Long, who formed the anemones in wax and glass, and Ottmar von Fuehrer, who created the setting and background

Sea Anemones

Beauties of the ocean depths brought inland

By STANLEY TRUMAN BROOKS

Carnegie Museum, Pittsburgh

FAR FROM the ocean, far from the rolling waves and whispering sands, is a picture; a three dimensional picture of a cool, green sea bottom—from the bay of Naples, Italy. In this picture with its rocks, grasses, and moss-like algae are many sea anemones, several crabs, and clumps of red gorgonid corals. This is a group that was built by two artists to bring to the eyes of inland city dwellers some of the beauty and magic of Nature. Here the sea anemones are seen in their natural settings; some are extended in their search for food, their long, graceful tentacles waving about in search of prey, while others are contracted, like so many jelly-like domes. On one side is a cascade of glistening white, the long and pointed tentacles of one of the larger forms, while perched above it on a ledge of stone is a differently colored individual of the same species. A curious mushroom-shaped anemone is hidden in one corner and one must peer into the picture from the side to see it. Below is a barrel-shaped species with thick, blunt arms, the yellow body spotted with rose-red and the arms tipped with pink. A very small, blue anemone clings to a blade of eel grass, but this is a large one when one compares the tiny brownish specimen that has chosen the shell of a murex snail upon which to ride. The large, erect specimen in the center of the picture is translucent in the light from above and

the entire body is armed with grape-like yellow clusters. Beside it, on the algal-coated stones, is a color phase slightly different from the erect one. It is contracted, the body contorted into many folds and wrinkles. Some passing fish or some chance encounter with the other anemone has caused this sudden change, turning it from the graceful seeking creature to the inanimate appearing mass of quivering jelly. The clusters on this one are blue-green in color with a sprinkling of yellow color. At the left a large, green anemone sends out a golden crown of tentacles. These are encircled with a ruff of white and delicately pointed ones. Other barrel-shaped, blunt-armed individuals sit almost hidden by the marine grasses at the left of the picture, looking down on a pinkish-yellow animal with arms of various shapes and hues. The bright red of the gorgonid coral, like some beautiful, curious plant, contrasts with the green and blue of the water and the distant rocks. But not all are anemones and corals. On a patch of sand in the foreground is a very peculiar crab. It appears much more like a huge spider than it does a crab. Its comically long and spindly legs are striped with reddish-brown and match the bands of the body. The head of this little crustacean is small but bears long eye-stalks that end in huge, bulbous eyes. Another crab with crimson pincers crawls upon a rock in the

shadow of an anemone, approaching the porous, dark sponge of the Mediterranean. Bright, crimson heads of algae cover the green-tinted stones, but here and there the clean-swept granular rock shows through the green and yellow plant growths and debris. The long, green fronds of eel grass, *Zostera*, spread out in the tidal current, pointing with cool, green fingers to their surrounding beauty. This is a picture, a picture built with brush and oils, with trowel and knife, with hands and skill, to bring the breath of far-flung places to our very door. This is a museum habitat group, representing one of the major functions of the modern educational institutions such as now exist in our great cities.

Sea anemones are classified with the jellyfishes, and are restricted to salt water. They are very common along our shores and are related to the floating, umbrella-shaped "jellies" so well known by most of us. A closer kin is the small coral animal that secretes the stony material that forms the reefs and islands of tropical seas. The anemone does not build, but is content to sit and eat, wave its tentacles, or contract into a mass of muscular jelly. When an anemone is touched, the body contracts, and the delicate tentacles are hidden from harm within

the body mass. Food is gathered by the tentacles, which form a bower around the mouth. The prey killed or stunned by the small stinging cells of these arms is slowly carried to the mouth and digested in the body cavity. Any indigestible materials are ejected through the mouth.

Reproduction may take place through the formation of eggs or by an outgrowth or *budding* of the body. This outgrowth or bud develops from the basal portion of the animal, becoming, in time, a miniature of its parent. When its development is sufficient to enable it to live free in Nature it breaks away from the parent body. Great clusters or colonies may be produced in this manner or the young may be washed away by the waves to take up its abode far from the parent colony.

The anemones, as their name designates, are truly the flowers of the sea; living, moving flowers, and a delight to observe in their natural surroundings. The shore dweller may see them in life, but for those who live in cities and inland towns this is difficult or impossible. Hence we have our museums with their artists, scientists, and teachers, who by their knowledge and skill are able to bring inland, for the delight of many who long to see them, even the beauties of the ocean depths.



THE TRAP-DOOR SPIDER
AT HIS BURROW DOOR

At the left this ingenious spider is coming out for a stroll, and at the right he has just gotten home and is going into his mansion



A Spider Artisan

By LEWIS WAYNE WALKER

COUNTLESS people tramp over the homes of the western trap-door spider daily, yet few know of the existence of the interesting creatures beneath their feet. Until about six months ago I believed this particular spider to be practically exterminated in the city of San Diego. Then I met Mr. Harris in beautiful Balboa Park, and he showed me in five minutes five nests, which took him five days to locate. These nests were within a hundred-foot radius on a hillside. Mr. Harris would point to within a yard of one, and then tell me to hunt. I scored just twenty percent in this game, so well did the trap-doors simulate the surroundings.

The interior of the trap-door spider's home is even more marvelous than the protective coloration on the top of the doors themselves. The tunnels range in width,

according to the size of the spider, from a half inch to an inch and a half across. In depth they go from six to ten inches underground. These tubes are lined with beautiful white silk. When they are removed from the dirt they are capable of holding water, so tightly are they spun. The doors, which are hinged on one side, have beautiful beveled edges that seat as perfectly as the valves of a motor. They are strongly constructed, and will stand a pressure of forty or fifty pounds.

As soon as the occupant of one of these tubes feels the jar of a footstep, he dashes to his doorway and pulls down on the silken threads. The strength in his little body is phenomenal. It takes a strong safety pin used as a lever to counteract the pull of his muscles when he is determined to keep home mysteries a secret.

Argus Eyes Under the Microscope

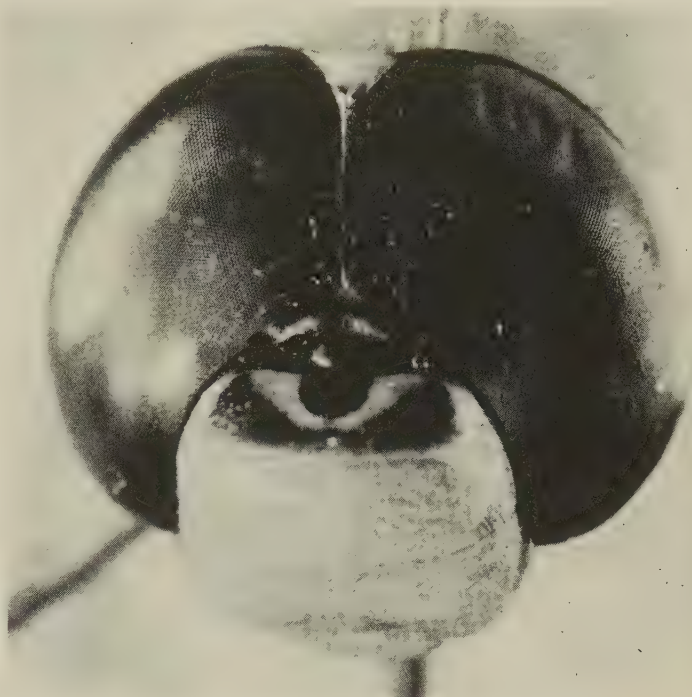
By JULIAN D. CORRINGTON

ARGUS, that hundred-eyed god of Greek mythology, must have been a mighty alert and watchful individual, but he was a mere tyro in the matter of eyes when compared with most of our common insects. Some ants, it is true, have only one or a few facets in each of their two compound eyes, but the house-fly has about four thousand, butterflies an average of around fifteen thousand, while the limit is doubtless reached in certain dragon-flies that have nearly thirty thousand.

What are facets? Well, take your microscope and observe the eye of any convenient insect specimen—house-fly or honey bee or butterfly, but, best of all, a horse-fly or dragon-fly. The surface of the large compound eye is seen to be composed of an immense number of minute hexagonal areas, the facets, each of which is the outer covering or cornea of a single eye, technically known as an ommatidium.

First-class sections of the compound eye require imbedding in paraffin and sectioning with a microtome, but passable results may be obtained by the free-hand method. Slice a grasshopper's eye vertically with a sharp razor blade and mount for examination with the cut surface uppermost. By careful focusing under strong reflected light it may be seen that each facet is the surface end of a long column, large numbers of which—the ommatidia—make up the compound eye.

Nerve fibers pass inward from the ends of these columns, uniting to form the optic nerve, which runs to the



PHOTOGRAPH FROM BAUSCH AND LOMB

THE COMPOUND EYES OF THE DRAGON-FLY

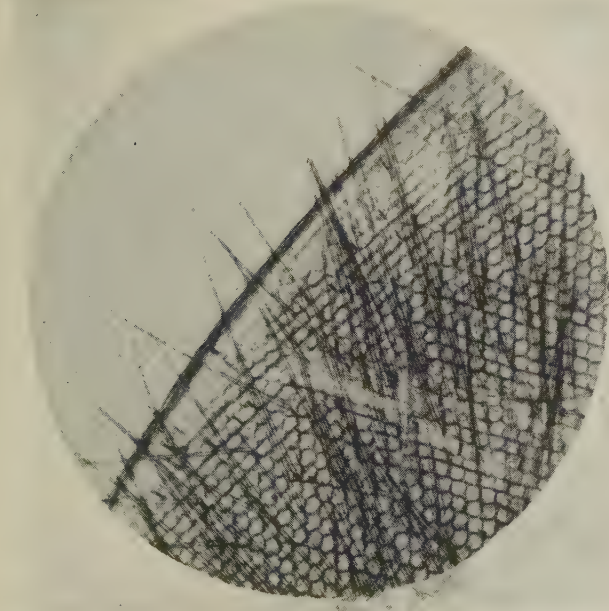
Each one of the minute hexagonal areas in the dark portion is the outer covering, or cornea, of a single eye

brain. Each eye is like a large bundle of tubes tied together, each tube slightly cone-shaped and larger at its outer end, so that no two tubes lie exactly in the same plane. If you could look through such a bundle you would see tiny patches of landscape and a photographic plate exposed to collect all these separate pictures would record them as a mosaic view of the whole panorama. That is just what the insect eye does. Each separate eye sees only a small fraction of an object, but the compound eye as a whole receives thousands of such pictures placed side by side like the tiles of a bathroom floor, and the result is a mosaic image.

This is a construction different indeed from the familiar eye of man or other vertebrates. The insect eye is inferior in the matter of acuteness of perception, but superior in detecting motion; inferior because there is no adjustable lens as in the human eye, to change its shape according to the distance of the object viewed. The insect lens is merely the cornea, a biconvex area of transparent tissue, and can focus only subjects close at hand. The superiority comes in when it is considered how any movement would cause shiftings of the image across adjacent ommatidia. Hence insects have poor powers of estimating exact shapes or sizes, but detect motion instantly and are alert to spring

THE SURFACE OF THE BEE'S EYE

Magnified 100 diameters, the facets are shown to have a protective covering of hairs



upon prey or retreat from danger. Image perception extends to a distance of a few feet only, but motion perception to much greater distances.

The cornea of the entire compound eye may be dissected off and mounted whole, first being run through strong alcohol and a clearer. In the honey bee this structure is covered with hairs, an adaptation for protection while exploring the depths of flowers.

In addition to their pair of argus eyes, insects also boast of simple eyes or ocelli, the usual number being three. What a wealth of eyes! These ocelli are small, have a single cornea, and are frequently grouped as a triangle in the front center of the head, between the antennae. Ocelli give only vague and general images of close objects and are of use mainly in distinguishing between various gradations of light and darkness.

Among all the hundreds of thousands of insect species it is not surprising to meet with unusual conditions in respect to the eyes, in addition to great variation in the number of ommatidia. Add as many of these as possible to your slide collection.

Some horse flies and wild bees have bright green eyes, while night-flying moths include a tapetum or reflecting layer in the eye, comparable to tissue of the same name in the eyes of such nocturnal mammals as cats and dogs,

as well as many birds, reptiles, and amphibians, and glow vividly in the dark with a yellowish or reddish light.

The compound eyes of a South African fly, *Diopsis*, are stalked and this form is much sought after by amateur microscopists for their collections of mounts. The common whirligig beetle or mallow bug, *Gyrinus*, of our freshwater streams and ponds, exhibits a curious condition well worth embalming in balsam. The beetle is dark silvery gray, about the size of a pea, and is to be seen on hot summer afternoons swimming round and round in rapid circles on the surface of pools. Each compound eye has two entirely distinct parts, a condition termed divided eye. The upper half lies out of the water and can perceive objects on the surface or in the air above, while the lower portion is immersed and views the underwater surroundings. The advantage of this highly specialized adaptation to any surface-swimming creature is obvious.

Finally, some ants, certain cave-dwelling animals, and many parasites have the eyes greatly reduced or entirely lacking. From total absence, insect eyes run the gamut in size and complexity until, in some flies, dragonflies and others, the compound eyes are so huge that the pair meet above in the middle line of the head. This condition represents the climax of eye development, at least as far as quantity is concerned, in the animal kingdom.

Sheep's Fescue and Others

By F. LAMSON SCRIBNER

THE Fescue grasses belong to the genus *Festuca* for which the Tribe Festuceae is named. They include about eighty species somewhat closely related to the blue grasses of the genus *Poa*. Like the Poas the Fescues are widely distributed throughout the temperate regions of the world and their economic values are along similar lines.

Sheep's Fescue, the type of the genus, represents a rather large group of species and varieties common to both Europe and North America, frequenting the mountain regions of both continents. It is a densely-tufted grass with rather short and very narrow basal leaves and small, erect and few-flowered panicles as shown in the illustration. It is valued as a pasture grass and its seeds are often used in lawn mixtures for places where the soil is generally dry and thin. A handsome glaucous form, Blue Fescue, is remarkable for its light, bluish-green, elongated leaves. It makes an attractive border plant.

Red Fescue, *Festuca rubra*, is a good pasture grass,

less densely tufted than Sheep's Fescue, and more or less decumbent at the usually red base, with larger panicles and longer-awned florets. It is less frequent than Sheep's

Fescue in America. It is quite variable and one form with filiform basal leaves is the "Shade Fescue" of commerce, sometimes used in lawn mixtures for shady places.

Meadow Fescue, *Festuca elatior*, is a superior meadow grass with leafy culms two to three feet high, and ample, more or less expanded, panicles 5 to 10 inches long, becoming contracted after flowering. It is known to some as English blue grass. In the illustration the effective decorative character of this grass used as a border is shown. Many

gardeners fail to realize how the grasses may be used to round out the garden scheme.

Like the Poas, the Festucas belong to the primitive type of grasses. The perennial species are excellent soil builders and sod formers and among them are several sand binders, notably *Festuca littoralis* of Australia.



A BORDER OF BLUE FESCUE

It is a handsome grass, remarkable for its light, bluish-green elongated leaves

The Bishop's Cap Cactus

By E. C. HUMMEL

THE DISCOVERY and subsequent exploration of the New World made known to botanists many new and interesting, as well as economically important, forms of vegetation on the continents of North and South America. One great group that was almost unknown to civilization before that time is the Cactus family. One genus, *Rhipsalis*, is represented by a species found native in Africa, where it grows on the trunks and branches of trees. Having white, glutinous berries it has been given the common name "mistletoe cactus." How it crossed the Atlantic is one of the botanical mysteries, but many believe it was carried by birds from the American continent.

The cactus family consists of some two thousand species and varieties. With their almost unlimited variety of form and color it is little wonder they are often mistaken for stones, artificial ornaments, sea shells or fungi, the latter being the case in the subject of the picture improperly captioned "Bishop Cap Mushroom", in the January, 1936, issue of NATURE MAGAZINE.

The true name of this remarkable plant, *Astrophytum myriostigma*, is from the Greek. A free translation shows this name to be composed of two descriptive words. The generic name describes the plant, "star plant"; the second describes a characteristic of the flower, "myriads of stigmas." To the cactus fancier it is known as the "Bishop's cap cactus." The

picture is of a healthy seedling that has had exceptionally good care and would be a marvelous addition to any collection, although its treatment has caused it to vary slightly from the form of the collected plant.

In their native habitat, the growth of these plants is slow; adverse conditions being the rule. The tiny tufts of hair, which can be clearly distinguished in the picture, are compact, entirely covering the plant. This covering, and its strange form, gives the Bishop's cap cactus the appearance of being carved from white stone. The extreme aridity of the native habitat of this, as well as many other forms of cactus, has caused it to acquire many devices for protection against excessive loss of moisture. The purpose of the plant's hairy covering is to reflect heat,

which in its native home often reaches a hundred and twenty degrees. This species, like the majority of the family, has a very glutinous sap that thickens when exposed to the air, thus quickly healing any injury and preventing loss of moisture.

A very interesting feature in this and many other cactuses is the formation of ribs. In extremely dry weather, as excess water is used from the tissue, these ribs contract like the folds of an accordion. With a new supply of water these gradually unfold.

The Bishop's cap cactus was first discovered on the limy hills of Hacienda de San Lazare, Mexico, in 1839.

Contrary to public opinion, however, the presence of lime in soils where it is found does not prove that when it is transplanted to our gardens an excess of this substance is desirable. On the contrary, it has merely built up a resistance against it. A mixture of leaf mold and reasonably porous soil gives much better results, and in the majority of districts sufficient lime is present in the water to supply that ingredient.

While the average height at maturity is from six to twelve inches, this cactus has been known to attain a height of two feet. As a general rule the diameter is from six to eight inches.

The hardiness of this plant as a household adornment is well known. It was imported to Germany and there, in glass houses, is grown by thousands to be

sold to the public for window plants. Perpetuated by seed from cultivated plants, it has been found necessary to reimport it but once during the last hundred years.

When in bloom this plant is truly a thing of beauty. The bud emerges from the central portion of the plant and develops into a beautiful yellow flower, nearly two and a half inches across, with a lovely center of bright red. As in some other botanical species, there are many varieties, the color of the flower differing slightly. Not being a constant characteristic, this cannot be used for positive identification. The early age at which it blooms, as well as the number of flowers produced in a season, is outstanding.

In the photograph, what appear to be the beginning



PHOTOGRAPH BY WRIGHT M. PIERCE

THE BISHOP'S CAP CACTUS

Sometimes mistaken for stones or sea animals;
and once for a mushroom

of spines can easily be seen. These, however, never mature. Old plants are entirely naked on the lower parts, even the hairy protection having fallen off. The genus *Astrophytum* contains several species, and these show a remarkable diversity of spine formation. The juvenile forms of three of these are so similar that they are hard to segregate. As the plants advance to maturity *Astrophytum myriostigma* keeps its spineless form. *Astrophytum capricorne*, the winding horn star plant, develops many long papery spines that wind upward, completely embodying the top of the plant. From the ribs of *Astrophytum ornatum*, the ornamented star plant, there evolve beautiful, straight, gold-colored spines an inch or so in

length. Another of this group, *Astrophytum asterias*, is entirely spineless, and has small scattered tufts of hair and a hard leathery cover. It is often mistaken for the empty shell of a sea urchin.

The seedlings of the Bishop's cap cactus are very interesting. There is nothing more fascinating to the cactus lover than to watch their development day by day. First, two small leaves appear above the surface of the ground, and between these the queer plant soon develops.

This entire family, from the climbing *Pereskia*, with its large succulent leaves, to *Rhipsalis*, with its grotesque network of stems, is little known to the average Nature lover, but is well worthy of serious attention.

An Alfresco Beehive

By L. CLAIRE HULBERT

LOOKING at the swarm of bees shown in the accompanying illustration, I wondered at their logic in choosing such an open site in which to take up house-keeping. Well out from the trunk on the limb of a catalpa tree, about ten feet from the ground and deeply shaded by the big leaves, the swarm had elected to remain, though what was to become of them when frosts removed the foliage forming their leafy canopy apparently had not been taken into consideration. But there they were, busily at work, and two or three sections of comb as large as your hand protruding here and there from the mass of working bees gave proof that they were not merely resting during a journey to more permanent quarters.

I recall as a child seeing a red-faced, badly-winded beekeeper vainly chasing a recalcitrant swarm of bees across a field adjoining the apiary. He carried a pail of water which he attempted to throw into the swiftly moving mass of insects, hoping by that procedure to cause them to alight temporarily that they might be recaptured. Banging on tin pans or other noise makers was supposed to be conducive to the same end. I also remember an exceptionally large swarm that the approach of darkness caused to collect on the under side of a rail in the fence by the roadside, but this swarm in the catalpa apparently had no such temporary intentions.

It was early in August, 1935, that Dr. Ernst A. Bessey, dean of the graduate school and head of the botany department of Michigan State College, knowing of my interest in Nature, told me of the location of the bees in a catalpa growing near the zoology building on the campus. Although my information came from un-



A SWARM OF HONEY-MAKERS

These learned insects chose Michigan State College as their alma mater, but were expelled

impeachable authority, it was with a somewhat skeptical attitude that I visited the spot he had described, but there were the bees to substantiate his story.

The photograph was taken September 5, and the bees were still at work after the beginning of the fall term of college, when they were observed by scores of students and others. Just what might have been the fate of these outdoor-housekeeping bees if left to themselves is problematical, for one cold morning somewhat later a member of the building and grounds department sawed off the limb and harvested the honey. Perhaps the authorities feared trouble from the proximity of bees to students or maybe it was cupidity on the part of an employe, but whatever the reason the alfresco beehive that had aroused the curiosity of so many people came thus to an end.



The Nature Picture of the Month

This picture of the long-billed marsh wren by V. L. Marsh, of Great Falls, Montana, has been chosen for this month's award in our rotogravure contest. The picture is particularly noteworthy because of the difficulty of photographing the elusive bird in the intricacies of its watery habitat.

The bird's habits are in keeping with its choice of environment. The nest is a fine example of ingenious architecture—a globular structure woven of fibers shredded from the material at hand and suspended from the rushes or shrubs above the water. A small round hole in one side serves as the entrance, and the interior is lined with cat-tail down, duck feathers or fine grasses. In addition to the nest actually used, the marsh wren may build a number of mock nests appar-

ently as perfect in design as the real one, but usually unlined. Reasons for this queer habit have been variously explained. Some believe this is done to mislead enemies, others that a series of nests at various heights is built to protect the bird against rising waters; probably, however, this multiplicity in nest building is merely a result of the male bird's exuberant energy. Perhaps he must find something to do while the female incubates.

Somewhere along the tree of life the marsh wrens branched away from their more tuneful cousins, the house wrens and the winter wrens, and in the process seem to have acquired a song as peculiar and reedy as their home. It is delightful to listen to their peculiar "Clup-swiss-tr-r-r-r", but it is seldom that one catches a glimpse of the retiring singers.



The gadwall is one of the species whose breeding range, never extensive in North America, lately has suffered disaster from drought, a fact that emphasizes the danger that besets a species sadly reduced by overshooting. This female is shown on her nest in a Utah marsh that now is one of the more important breeding grounds left in the United States. This and the five succeeding pictures were taken by Alfred M. Bailey, of the Chicago Academy of Sciences, on the Bear River Migratory Bird Refuge on Great Salt Lake.

It is gratifying to find the beautiful snowy egret still nesting in fair numbers in our southern and western states. Until the outlawing of the trade in "aigrettes," the long filmy plumes that adorn the birds in the breeding season, this and several other beautiful species seemed to be doomed. The reader may imagine the fate in store for these young birds had their parents been killed that someone might wear on her hat the "aigrettes" from their backs. Forsooth, fashion knows no pity.



If the American avocet had no other conspicuous features, its slender upturned bill would at once attract attention. The use of so peculiar a beak is evident when one observes its feeding habits. With the tip of the bill partly opened and submerged, so that its convexity touches the bottom, the bird sweeps it from side to side and gathers in the minute shells, aquatic insects and other creatures that inhabit its watery haunts.

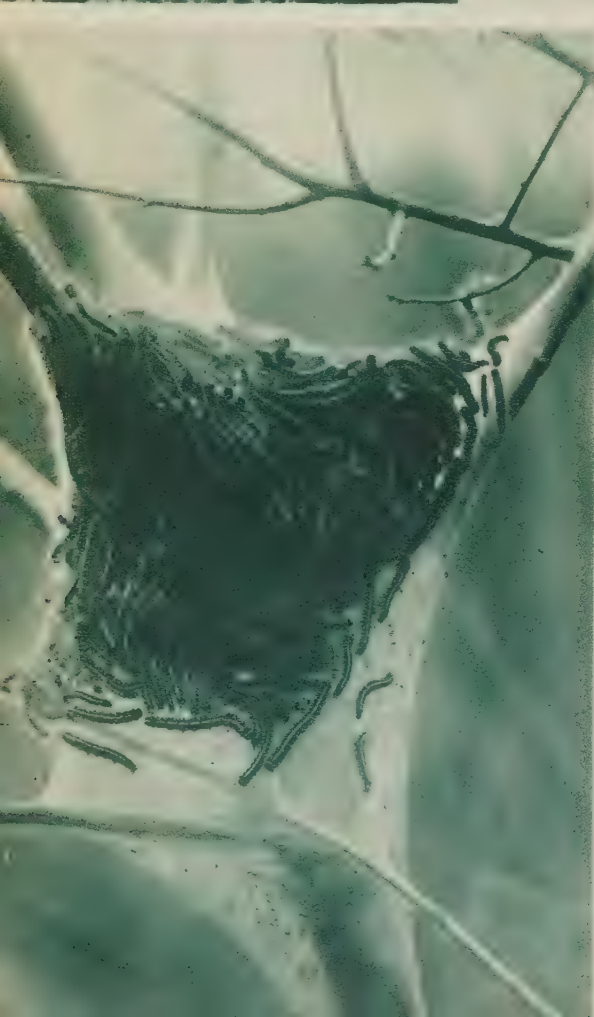
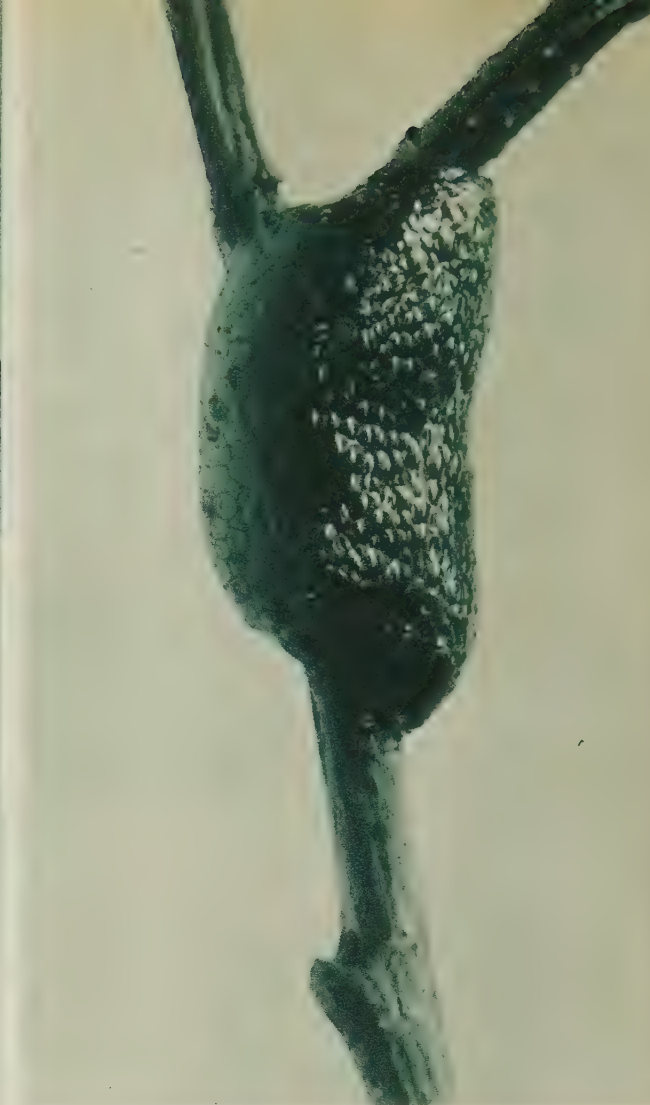
Among our larger shore birds the willet is one of the most beautiful. Formerly the species bred in great numbers along our eastern seaboard and wintered from the Gulf States southward. Now the bird is rare everywhere in the East. Fortunately, however, the western form of the bird still occurs in fair numbers in certain favorable places in the west. For many years its killing has been forbidden and the bird has been able to retain a foothold in many places.



The redhead, dangerously reduced in numbers, breeds only in our western states and southern Canada. This mother bird was photographed on its nest on the Bear River Refuge, one of the more important nesting areas left in the wake of settlement, drainage, and drought. So scarce has the bird become that extinction is imminent if it is not given total protection.

The white-faced glossy ibis is the only true ibis that occurs in any considerable numbers in North America. It still breeds in favorable places from middle Mexico north to Oregon, Nevada and Utah. In the Bear River marshes, one of its principal nesting sites, it shares with the snowy egret and other herons the tule marshes. The nests are roughly built on the matted beds of tule. The food of both adult and young consists of crawfish, snails, water insects, fishes, and frogs.





So You May Know the Tent Caterpillar

Photographs by L. W. Brownell

Tent caterpillars are members of a family of spinners of silk closely related to the "silk worm" of commerce. They serve no such valuable purpose, however, often stripping orchard, shade and forest trees of their foliage in the course of their voracious eating. In the eastern part of the United States the common species of tent caterpillar is *Malacosoma americana*, while in the West the forest tent caterpillar, *Malacosoma disstria*, is the chief offender. The eastern species is pictured here.

On the limb of the tree we see three moths of the tent caterpillar. The females are larger than the males, but both are dull reddish in color with a tinge of brown. There are two oblique pale stripes near the middle of each forewing. The eggs laid by the female are found in masses, each mass containing two to four hundred eggs held together with a glue-like covering. If these are detected during the winter they may be destroyed. The young caterpillars hatch in early spring, and after eating the covering of the egg mass set out in search of green food, and form a nest as a base of operations.



The extent of the activity of the tent caterpillars may be gathered from the elaborate runways spun about the base of a tree. This also suggests how and why trees are so completely defoliated. During June, or later, depending upon the latitude, the full-grown, well-fed caterpillars scatter, each searching for some sheltered spot in which to spin a cocoon. Under stones, loose boards, on the side of a house, fence corner or other protected place they spin about them a spindle-shaped cocoon of white silk, filling the spaces between the silken threads with a fluid that quickly dries to a sulphur-yellow powder. Within a period of from ten days to two weeks they change from caterpillar to pupa. If the cocoons can be gathered at this time and burned it helps in the control of these pests.

Spraying with arsenate of

lead is effective in controlling the young caterpillars, but one of the most effective means of control is hand-gathering of egg masses in winter and cocoons in spring or early summer with the aid of bright-eyed youngsters.





It is hard to realize that either of these dainty twin moose calves may grow up to wear a "bell" and the massive antlers that are sported by the great bull shown below. They seem so innocent and gentle that one wonders by what magic they survive to an age when they need to fear nothing but man. Should these little ones, especially at a time when the mother is not near, be found by the hunter, they may follow him trustfully to camp. But this age of confidence is soon left when the moose becomes the lord of his realm. The twins were photographed on the Riding Mountain National Park, Manitoba, and the big bull on the Elk Island National Park, Alberta. Photograph courtesy of Canadian Parks.

• • •

This lordly elk, *Cervus canadensis*, posed for his portrait in all his antlered glory on the Buffalo National Park near Wainwright, Alberta. The lush meadow in which he stands bespeaks the presence of abundant forage.

The photographer has also caught a mule deer, *Odocoileus macrotis*, in a natural frame, with the trunks of conifers on each side, and a background of aspens and other forest trees that represent homelike surroundings. Contentment and well-being is indicated by every contour and expression of this alert creature.

Both photographs courtesy of the Canadian Parks.

• • •





These mule deer, contentedly wading the riffles of a placid stream in its summer stage, are suggestive of the wildness and charm of Canada's parks. One may easily imagine this river as it appears in spring, when the melted snows have made it a swollen torrent that bears huge trees on its resistless flood.

Two young caribou in Jasper National Park engaged in a playful battle, in training for the later time when they will fight in earnest, driven by the mating urge. This fine animal is here close to its southern limit of fair abundance, and it is gratifying to know that in this park its perpetuation is reasonably assured.



Orchids

One of Nature's Most Beautiful Groups

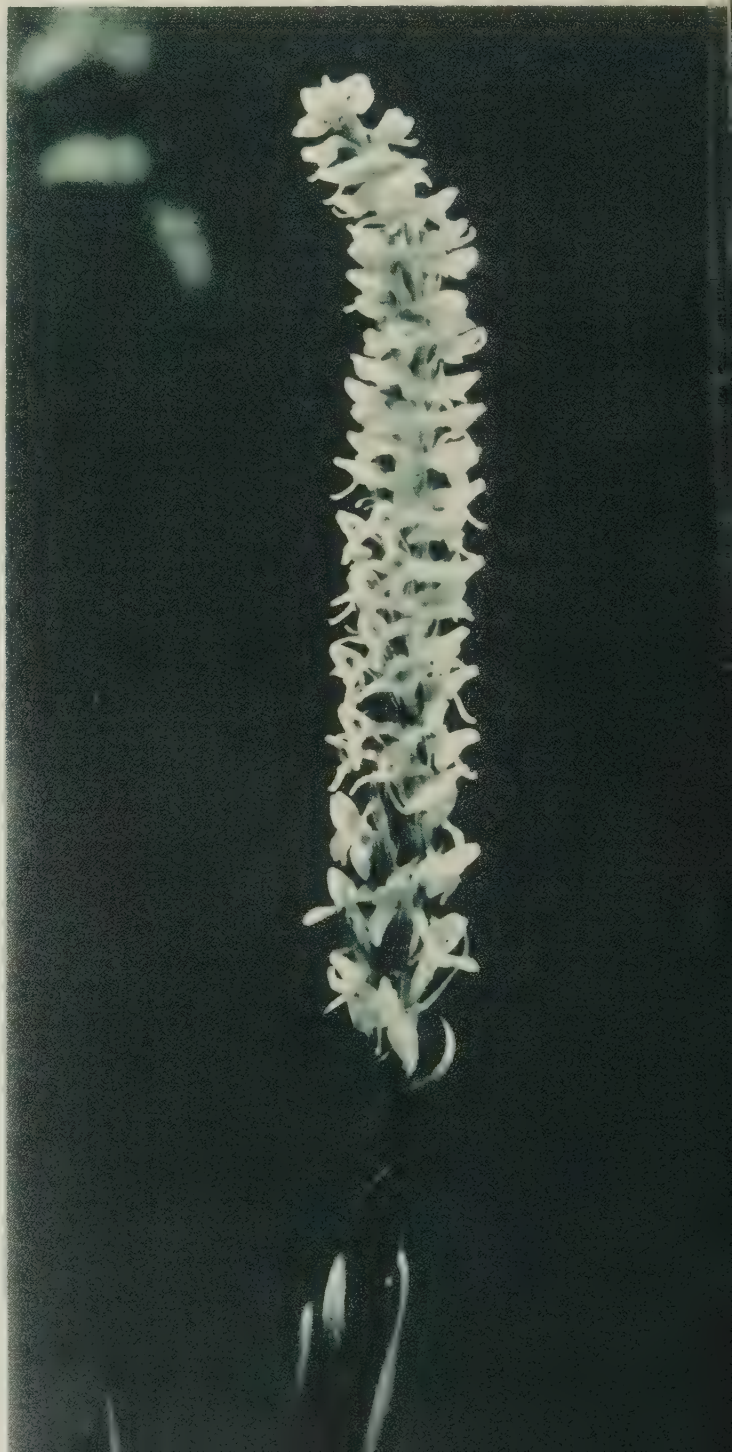
One of the largest and most beautiful of our orchids is the showy lady slipper, whose pouched flower is white, more or less streaked with light velvety crimson magenta. These gorgeous plants, blooming in June and July,

grow in isolated colonies or at the edge of wet woods. The photographs of orchids on this and succeeding pages were taken by W. Bryant Tyrrell of Catonsville, Maryland. These grew near Bloomfield Hills, Michigan.



Members of one of the most pleasing of orchid groups have the lower petals fringed. Most of these are colored a delicate pink, but this one, *Habenaria ciliaris*, is a golden yellow. It is identical in all characteristics, except color, with a white relative with which it often grows. But it has a wide range and is considered by the best authorities to be a distinct species.

This plant was photographed near Laurel, Maryland, August 5, 1935.



A lovely group of orchids is the tribe of ladies' tresses, particularly pleasing because several of its members delay their flowering until cold weather, and thus vie with the gentians for supremacy in delicate beauty at a season when there are few flowers to greet us on our woodland walks. This is one of the largest of these gems of pure white artistry. It is *Spiranthes romanzoffiana*, which is found from Newfoundland and New England to California and Alaska. There is also a colony in Ireland.

This plant was photographed at Orion, Michigan, June 30, 1935.



A clump of the small white lady slippers, photographed on the edge of a tamarack swamp, is pictured above. With them has been placed, for contrast, a single pink slipper. Photographed at Wixon, Michigan, in June, 1928.

The rattlesnake "plantain," shown at the left, is one of our common orchids, most often found in pine woods. It blooms in July and August, and the flower stalk rises from a rosette of bright green reticulate-veined leaves that always make identification easy.

Habenaria orbiculata, known by its thick, fleshy, rounded leaves, usually twins, with a spike of delicate greenish-white flowers, is found in the cool mossy depths of heavy woods, usually beneath conifers. Photographed at Sweetair, Maryland, June 30, 1935.





A Long-eared Owl Family

When the nest was first photographed on May 12, the eggs were just "pipped"—that is, the young birds had broken the shells in their eagerness to be born. M. H. Oldham of Lansing, Michigan, had found the nest near his home, and had decided that this was a fine subject for his camera.

About ten days later the nest was again visited, and the mother bird was found carefully guarding her week-old babies. So solicitous was she for their safety that she braved the eye of the camera at short range rather than desert them even for a moment. There was already evidence that the young birds were being well nourished.

When the youngsters were a little more than three weeks old the two stronger of the nestful were found out on a sturdy branch, having grown tired of their residence of sticks. Doubtless they are already dreaming of night-long flights through meadow and copse, and the joy of catching for themselves the mice and frogs that their hard-worked parents had so generously provided.



The Breaking Clouds

This photograph was taken from a mountain slope at an elevation of 9500 feet in Yosemite National Park, one mid-afternoon when a spring snowstorm had just passed on. This and the three succeeding pictures were taken with a Zeiss Ikon camera, Maximar B. Model, by Richard G. Johnson of San Francisco, California.



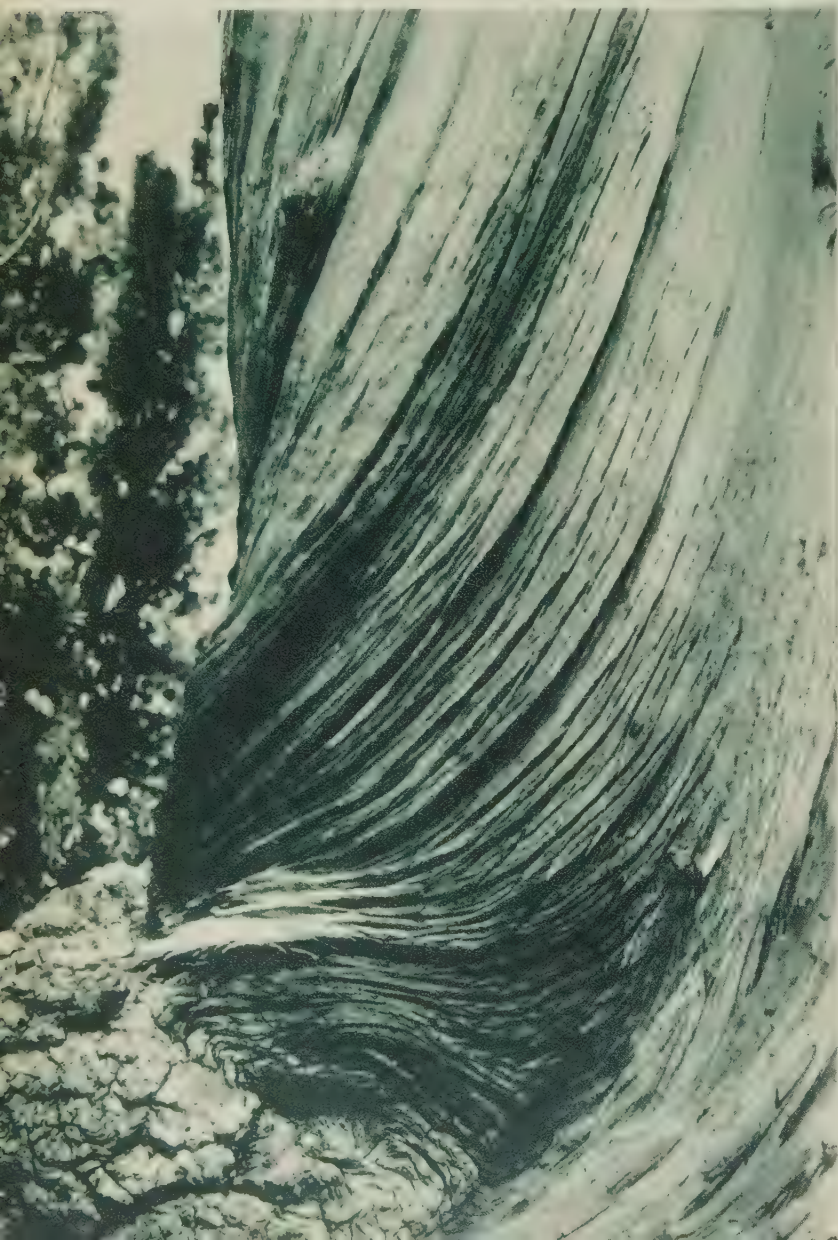
Limit of Existence

These white-barked pines, *Pinus albicaulis*, have finally succumbed after many years of storm-beaten existence at 10,500 feet at Granite Pass in the Kings River region of the Sierra Nevada.



Nature's Cross

Surmounting a jutting crag on Windy Ridge, 11,000 feet altitude in the Kings River section of the Sierra Nevada, stands this picturesque relic. Here grew two white-barked pines. From one extended a horizontal limb that pressed so closely against the trunk of its companion that finally it was surrounded by the living wood of its suffering neighbor. Then the offending limb died, and was severed by decay from its parent. Time passed, and the larger tree also died. Now, years later, only the broken trunk remains to tell the story.



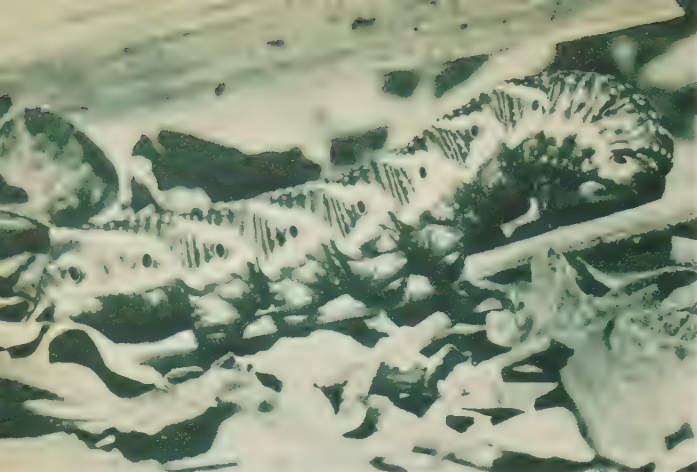
Swirls and Snarls

Here is a mute story of the stress of wind and storm. Many years ago, before the white man had set eyes on this spot, there sprouted a pine sapling. The snows drifted over it, and bore it down, but it rebelled, and rose triumphant. Then through many winters the winds of the high Sierra twisted its fibers. Still it triumphed, and with the mark of its adversaries still implanted in its core, it grew to maturity and became a giant. Finally old age, or perhaps the red demon of fire, vanquished the veteran. Now, no longer living, it stands as a monument to persistence.

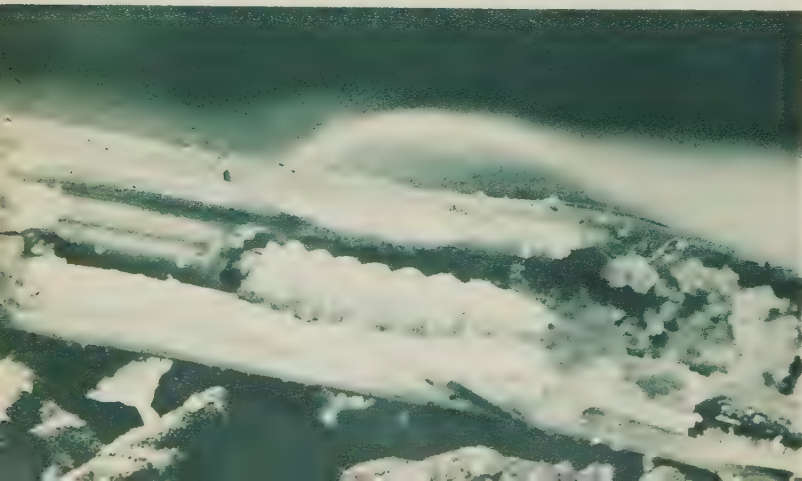


A study of three different species of mushrooms is presented by Alice Caton of Knoxville, Tennessee. Above is the Jack-o'-Lantern, so-called from its phosphorescence, but a truer guide to its character appears in its scientific name, *Clitocybe illudens*. Illudens means deceiving, and although the plant is beautiful in its dress of brilliant cadmium orange, it is unwholesome, hiding evil under gorgeous coloring. In the upper right corner is the sulphur mushroom, a beautiful shelf fungus with an orange upper surface. It grows widely over our country on dead trees as well as from wounds in live ones, and is edible when young and tender. Age makes the flesh tough and undesirable for food. At the right is the lime mushroom, *Amanita chlorinesma*. It has a strong chloride of lime odor and thus one may detect it even before it is seen. The genus *Amanita*, one should remember, includes the most deadly of mushrooms. Note the characteristic veil and cup at the base.





GARDEN PESTS



Here we introduce four common garden pests, enemies of both the backyard gardener and the farmer. At the top of the page, somewhat enlarged, is the tomato worm, this particular species being known to science as *Protoparce quinquemaculata*. In the South it is more frequently called tobacco worm. One of the tasks of the farmer is to detect and destroy these huge green caterpillars. But he would fare worse were it not for the services of a tiny parasitic fly that lays its eggs beneath the skin of the portly larva. At the right is shown a tomato worm whose days are numbered. On its back appear the cocoons in which the young flies will complete their development. Those tomato worms that escape will pupate below ground.

At the left is the adult and, below it, the larva of the Colorado potato beetle, *Leptinotarsa decimlineata*, enlarged about ten times. Until about 1855 it was known only in the southern Rocky Mountain region, where it fed on the wild relatives of the potato. Then man introduced the potato to it, and the beetle followed its new food eastward, and eventually spread over the entire country. Each female lays about 500 eggs, and there are two generations each year.

Below, at the left, is the squash-vine borer, *Melittia satyriniformis*, shown in its favorite habitat—the stem of the plant he infests. It has a soft white body and a black head. The larva, when it has attained its full growth of one inch, leaves the stem of the plant, bores an inch or two into the ground and spins a tough cocoon, the outer threads of which are well mixed with particles of earth. The pupa has a horn-like growth between the eyes that is said to be used for cutting the cocoon when it is ready to emerge.

The last picture represents the larva of a black swallowtail butterfly, *Papilio polyxenes*, a carrot and parsley pest. The adult is a beautiful species marked with brilliant spots of blue and yellow found practically throughout the United States and southwardly. The eggs may be laid on wild plants, but the larva is quick to adopt the cultivated plants above mentioned, as well as celery. Otherwise, it is a rather attractive creature that changes its style of dress at each molt, and will poke out its orange, ill-smelling "horns" if you threaten to touch it.

★ Conservation ★

A section of Nature Magazine devoted each month to the expression of practical opinions on the vital issues affecting our use and abuse of natural resources, including wildlife, and dedicated to the purpose of assisting Americans to play a militant part in the attainment of constructive conservation aims.

ARTHUR NEWTON PACK, *Editor*

MUST THE LAST DUCK DIE IN ★ MARYLAND? ★

region is blessed with an abundance of food for wildfowl, so many of the birds choose to go no farther south. From these natural causes, and with no credit to the people of Maryland, the colony and the State has always had waterfowl in relative abundance. So long as there are any wild ducks and geese in the eastern United States, a good share of them will visit the famed Susquehanna Flats. In the melancholy but not improbable event of this generation's killing off the last of the wildfowl, that bird probably will die on those Flats.

By accidents of geography and history, Maryland fell heir to bays and shoals now unique in their attractiveness to waterfowl, and the fate of the birds depends greatly on their treatment in the Free State. Instead of being prudent and conservative, however, Maryland's usage of the waterfowl has been reckless and spendthrift. Superior advantages for waterfowling have attracted to the shores of the Chesapeake gunners from such centers of wealth as Philadelphia and New York, "sportsmen" imbued with the idea that money can buy anything and excuse everything. The Susquehanna Flats have been notorious for large scale violation of laws intended to protect waterfowl and the Chesapeake region has always harbored some of the greatest game hogs of the Nation.

State officials have been impressed by the wealth and power of these plutocratic law violators and have catered to, rather than curbed, them. They have wept bitter tears over the legal hardships on hunters and have ever been ready to demand greater privileges, on the fraudulent plea that "There are just as many ducks as ever." They are at it again this year and are appealing in the press for relaxing, from their point of view, the oppressively stringent regulations. The effort is clearly intended to influence Federal migratory bird regulations for 1936 not yet announced. Return to the iniquitous "staggered" season and to the murderous practice of "baiting" is demanded.

Maryland lies against the sea; the ducks can go no farther east. The upper Chesapeake

Maryland always has been, and evidently still is, in the "dark ages" so far as conservation is concerned.

State officials seem not to realize that Federal regulations are meant to protect waterfowl, not to help the gunners to exterminate the birds. Those officials point with regret to the fact that the kill of 1935 was only 6384, compared to 44,269 in 1934. They do not seem to realize that reduction of the kill is exactly what was intended by the regulations of 1935 and that it is a matter of congratulation throughout the Nation if this object was realized. They want to return to "baiting", and shooting periods alternating with "rest days" for ten weeks, and higher bag and possession limits. Whether through ignorance or worse they want shooting practices that will hasten the end of the waterfowl—a fate now inevitable unless the most drastic protective measures are adopted and absolutely enforced.

Fortunate as Maryland has been in possessing the Susquehanna Flats, the State has within its own borders areas where the fateful decline of waterfowl is overwhelmingly apparent. The Potomac, a practically all-Maryland river, has also been renowned in the past for its wildfowl. Now, however, such ducks as the canvasback and scaups, once numerous species, do not number one to a thousand compared to the numbers of ten years ago. In recent years, the redhead, a favorite game duck, formerly abundant, has scarcely been noted, and gadwall, baldpate, whistler, butterball, and ruddy have almost disappeared. Were one to judge of the fate of ducks by their recent history on the Potomac, he could only conclude that some species already are so reduced in numbers that they cannot recover, and that even those still fairly numerous have shown a long-continued, steady, and ominous decline.

Potomac wildfowl history certainly concerns Maryland and should inspire something quite different from the perennial plea of officials and gunners of the State for more killing privileges. Unless that cry is stilled, unless the Maryland native game hogs and the non-resident malefactors of great wealth mend their ways, the last duck will die in Maryland sooner than some people think.

SOUTH CAROLINA vs. RUTLEDGE ★★

olina State Legislature over Archibald Rutledge's opposition to the Santee-Cooper water power project. The poet laureate of South Carolina, in keeping with the preamble of the United States Constitution, exercised his right of free speech and declared there was more to be lost than gained by completion of the project.

For this the state's upper house passed a resolution which would have removed Mr. Rutledge from his honorary position of poet laureate. By the same logic, if it can be called logic, the state senators should have begun impeachment proceedings against any of their own members who were not in favor of the project.

The South Carolina senators must have forgotten for the moment that the laureateship was not a state political job that could be snatched away if the recipient didn't "follow the leader." As the Anderson (S. C.) *Independent Tribune* so aptly put it: "The senate showed itself to be an Indian-giver. It doesn't want to play for keeps, except for its seats." The lower house, however, apparently comprised of saner individuals, rebuked the senate for its attempted censure of Mr. Rutledge. We

We note that there has been much ado in the South Car-

are glad to learn that the attempt was a failure and that free speech prevailed.

The opposition of the American Nature Association to the Santee-Cooper project is not dependent wholly on Mr. Rutledge's testimony as expressed in *NATURE MAGAZINE* for March. Long before the article was written the Biological Survey made a special examination of the region to be affected and advised against the damming project on the ground that it would be detrimental to wildlife of many kinds.

The damming of the Santee, and the diversion of water into the Cooper will result in the destruction of the rich bottomland forests of the former stream, now a marvelous habitat for many forms of wildlife, and also, by permitting the intrusion of salt water, seriously impair the value of the delta and the whole lower valley as waterfowl habitat. Mr. Rutledge points out other considerations, historic, esthetic and financial, that militate against the project.

Jay N. Darling protested, long and loud, the consummation of the project. Apparently, however, as in many other cases, biological and esthetic considerations were not considered to weigh against the desire to foster employment on a large scale and to add to the already overabundant supply of power.

HOW BOY SCOUTS MAY HELP

to discuss means of protecting wildlife, and thus contributing to the purposes of the General Wildlife Federation, Boy Scouts everywhere have a wonderful opportunity to help the wild things, the country, and themselves.

A Boy Scout is kind to animals; he studies their habits by watching them in their native haunts; he kills nothing needlessly. Not only are these qualities urged by the rules of his organization, but they will be the natural result of those higher attributes that will come to him through all his training from Cub Scout to Eagle Scout. These qualities will help him to success in all his woodcraft and campcraft, in fact in all the scoutcraft that is helping him to become a good citizen. Just as cruelty is the sign of a coward, so are mercy and gentleness the marks of the truly brave.

The General Wildlife Federation is born of the need for fair and merciful treatment of our birds and mammals. Under the kindly care of Nature these creatures were developed; the earth feeds and shelters them; the sun warms them. Until man and his works came among them, they prospered. Now they are vanishing under his persecution. And they need so little; only mercy and

With the establishment throughout the country of organization meetings held by the Junior Chambers of Commerce

kindness. They ask only for a "break", in the language of the poster that is the official emblem of the Federation. What is their greatest menace is pictured by J. N. Darling, now director of the General Federation, in one of his famous cartoons. In the foreground the fourteen million hunters of the United States are storming the Capitol, demanding their "rights", while back in the distance are the Women's and Girls' Clubs, the Garden Clubs, the 4-H Clubs, infants of the coming generation, and, somewhere, the Boy Scouts, all hoping that, somehow, some wildlife will be spared for their education and enjoyment. These thoughts seem to be the spirit of "Ding's" cartoon.

It is the conviction of a majority of our more enlightened citizens that the highest service that our wild creatures give to modern man is in esthetic and inspirational values. It follows that, as far as possible, these wild creatures, along with their suitable environment, should be preserved to play their parts in Nature's great outdoor pageant. The qualities engendered by earnest contemplation of Nature are among the highest that contribute to the upbuilding of worthy citizenship. But wildlife will not be preserved for this higher service unless our Boy Scouts and Girl Scouts and all other organizations, both of young and adults, whose purpose is unselfish service, work earnestly for its conservation. In this effort there must be militant action: it must be prompt, concerted and unmistakable in its meaning.

DO YOU WANT PURE STREAMS?

Then support the Lonerger Bills now in Congress

By KENNETH A. REID

FOR many years conservationists have deplored the increasing pollution of our streams. A great deal has been said and written on the subject, but very little is done. Various state and federal agencies, having more or less jurisdiction, have spent millions of dollars in the fight against pollution, but while there have been isolated gains here and there, the plain fact remains that the spread of pollution is outstripping our best efforts and is growing year by year. Some public agencies have done their level best under their limited authority, but others have busied themselves with endless "investigation and research" on self-evident facts of pollution, and with laudatory reports on the "progress" they were making, to justify their existence and make the public think something was really being done. In reality they have served to protect their industrial masters from any interference on the part of the public while they continued to use the public waters as their private sewers.

In answering the objections raised by Washington regarding the propriety of spending federal funds for the purification of water on private lands in the work of sealing abandoned coal mines, the belief that pollution control was, after all, quite logically a national or federal responsibility became a firm conviction with the sponsors of this work. Streams are no respecters of man-made political boundaries, carrying their attendant load of pollution with utter disregard for such boundaries. As it is not possible to confine water or the pollution in it to the political division of its origin, so it is not possible to control pollution effectively by local or state agencies. Polluted water, by the law of gravity, flows downhill and away from the polluter, and often the injurious effects are felt more by the people of an adjoining state than by those in the state of its origin. Where this is the case, state control fails miserably, and as for voluntary action—well, human nature just isn't built that way when it necessitates some trouble and expense for the benefit of downstream neighbors, especially when separated by a state boundary.

It was such thoughts as these that prompted calling the "Dern-Lonerger" Conference in December, 1934, to formulate a plan for the purification of streams on a national basis. As limited authority is already vested in the War Department for the control of pollution in navigable waters, this conference with the Secretary of War seemed a logical first approach. The final recommendations of the

conference were that the problem was national and interstate, not local or state in character, and that some federal agency should be empowered to attack the problem on a nation-wide basis through established watershed districts irrespective of state lines. The proceedings of the Conference, contained in Senate Document 16 of the 74th Congress, by Senator Augustine Lonergan, constitute a veritable textbook on pollution control.

After more than a year of further study of means and methods of pollution control, and the laws, both state and federal, relating thereto, Senator Lonergan in February, 1936, introduced in the United States Senate two bills, S-3958 and S-3959, embodying the essential recommendations of the previous conference bearing his name. These two bills, both as to the mechanics of operation and the legal aspects, represent the carefully con-

Pollution of streams is a vital issue affecting the United States from coast to coast. It is a problem that can only be solved from the national point of view. It is a question that has been studied long enough. The facts are known. The vital need of action is indisputable. The solution lies in the passage of the Lonergan Bills, S-3958 and S-3959. It is the responsibility of every American sincerely interested in conservation to demand that their spokesmen in the Congress support the passage of these bills.

sidered and mature judgment of many of the nation's leading authorities.

The first and more important of these bills, S-3958, provides in Sections 1 and 2 that the National Resources Committee, consisting of the secretaries of the different federal departments, and three additional appointive members who shall devote their full time to the work, be empowered to execute the provisions of the bill. Because of decided opposition in many quarters to the creation of additional agencies of the Federal Government, it was deemed advisable to select some existing agency as the central administrative body.

Section 3 provides for cooperation with state agencies in coordinating their activities, encouraging enactment of uniform state laws, encouraging interstate compacts, and making such studies, surveys and experiments as may be necessary. It also provides for the collection and dissemination of information and the assignment of experts to existing state agencies when requested, and the arrangement of loans for the construction of waste treatment plants. Section 4 specifically provides for interstate compacts by giving the consent of Congress in advance, while Section 5 covers the mechanics of "Studies and Surveys".

Section 6 provides that the Committee shall divide the United States into Sanitary Water Districts on the basis of natural watersheds or drainage basins and fix the standards of purity for such districts. Section 7 provides for the establishment of District Boards to administer



WASTE FLOWS INTO A STREAM FROM AN OPEN SEWER

Such conditions, multiplied many times, are making thousands of streams unfit and a menace to the health of the American people

these Sanitary Water Districts, and empowers them to prevent pollution by voluntary action, to investigate and recommend loans or grants for treatment works, and to institute proceedings for prevention or abatement of pollution where other methods fail. Section 8 covers the methods of making loans or grants and specifies that they may be made only on the recommendation of a State Agency or the District Board.

Section 9 provides the mandatory power so essential to prevent the ever-present recalcitrant minority amongst polluters from nullifying a desirable abatement program. It provides that an action in equity may be brought in the name of the United States by any United States attorney, and that it shall be the duty of such attorneys to do so on the request of the Committee or the District Board, when other methods have failed to secure the cooperation of any polluter in abating his nuisance. This section, together with Section 6, was the especial target for the apologists for pollution in their opposition to the bill during the recent hearings. Few of the opponents objected, and some of them went on record as favoring, those sections of the bill that provided for more investigation and research, cooperation with state agencies, loans and grants, and other voluntary or cooperative measures; but as to those sections that threatened to make the bill really effective in pollution abatement, and not just talking about it in high-sounding terms, they came out in their true colors and strenuously opposed it.

S-3959 merely makes much needed amendments to the "Deposit of Refuse Act" of March 3, 1899, and to the Oil Pollution Act of 1924. In the first case the exemption of liquid pollution is eliminated, to prevent the recurrence of the type of nuisance committed by a large city on the

Mississippi that technically complied with the wording of the act by grinding up its garbage, mixing it with water, and discharging it as a "liquid" directly into the river. The second section extends the provisions of the Oil Pollution Act to include refineries and factories in the drainage basin as well as ships in the coastal waters. These old acts in their present form are largely ineffective, and therefore have met with little or no objection from polluting agencies, but the proposed amendments that would make them operative were vigorously opposed.

The Lonergan pure streams bills were first presented to the North American Wildlife Conference held in Washington last February, where they were approved unanimously by the pollution group meeting. Since that time, they have been enthusiastically endorsed by the Izaak Walton League and every prominent conservation organization that has considered them. On the other hand, the industrialists, individually and through their associations, are opposing the bills. This is not a surprise, for they can be counted on to oppose every worthwhile measure that promises to abate stream pollution, because they do not want anything that might even remotely threaten to interfere with their time-honored assumed right to use the public waters as sewers for their wastes. It is significant, however, that not a single municipality opposed the bills.

I was a member of the Dern-Lonergan Conference and have attended both of the hearings on the bills in question, and so am quite conversant with the arguments of the opponents. There was nothing new in them, but merely slight variations here and there in the old moss-grown calamity cry that the polluters have used for years. However, since the proposed bills are federal, they had to

POLLUTION TAKES ITS TOLL OF FISH LIFE

One result of lack of control of
what goes into the stream waters

dig up a substitute for the familiar argument of "competitive disadvantage to industry", which they always put up against state anti-pollution bills.

There was a remarkable similarity in the testimony of the different opponents. With few exceptions they professed sympathy with the purposes of the bill, but claimed that it was either not feasible or was impossible to change their methods. Reams of figures were given to show the hundreds of millions or billions of capital invested, the millions of people employed, etc., all of which would be lost and the employees thrown on relief if the Lonergan Bills should pass! There was a great deal of talk about confiscation of property through the control of pollution, but apparently no concern for the tremendous losses resulting from the present lack of control. The U. S. Public Health Service and existing state agencies were praised for doing splendid work and described as affording "entirely adequate control". On this latter point, J. N. Darling, in a letter to Senator Lonergan, says: "It is idle to contend that ample authority already exists, since the present conditions have been the result of existing control—or lack of it".

An interesting example of insincerity was afforded by the testimony of several of the gentlemen from Pennsylvania, who had also attended the hearings in Harrisburg during the last regular session of the Pennsylvania Legislature, and who had been instrumental in defeating that bill. At Harrisburg they professed sincere sympathy for the purposes of the bill, but contended that to pass such a bill in Pennsylvania would penalize Pennsylvania industry, put it at a competitive disadvantage with industries of other states, and eventually drive it beyond state borders. "Such legislation," said they, "should be federal, not state, and thereby eliminate such inequalities". At Washington these same parties again professed sincere interest in stream purification, but said that the control was properly a state function, not a federal one! When a state bill is under consideration they favor federal control, and when it is a federal bill, they favor state control! The real truth of the matter is that they favor no control, and this fact, though disguised, is evident from a study of the testimony.

Some of the testimony was so absurd as to need no rebuttal. One gentleman came all the way from California to explain at great length that California gold mines did not pollute streams—and then in the next breath claimed that the passage of the Lonergan Bills



would put the gold mining industry out of business. Probably the most amusing, however, was the gentleman from Alabama who claimed, first, that Alabama coal mines did not pollute the streams; then, that the sulphuric and other acids from the mines benefited the streams by settling out the silt and disinfecting any germs that might be in the water; then, that forest fires killed more fish than all the mines and mills in the country, even if operating full time; and, finally, that the volume of Alabama rivers is so great as "to dilute any pollution now, or for many years to come, flowing into the same, to a degree where it is unappreciable or unrecognizable". Finally, after nearly two hours of verbose calamity howling he closed with a harrowing word picture of the automatic closing down of practically all Alabama industries if the Lonergan Bills should pass.

But polluting industries are not the only forces fighting the Lonergan Bills. Paradoxical as it may seem there is veiled opposition from some of the existing agencies that are now clothed with more or less authority in the matter of stream pollution control. They seem to fear that the passage of the Lonergan Bills might really solve the problem and in doing so might put an end to their perennial "study of the problem". As long as they merely investigate and make reports painting beautiful pictures, they offend no one and feel safe in their jobs. Some of these shadow boxers in the pollution control racket are apparently "more bureau minded than action conscious".

A similar type of opposition is to be found in several new so-called anti-pollution bills that have made their appearance in Congress since the introduction of the Lonergan Bills. One carries a considerable appropriation to the U. S. Public Health Service for carrying on "investigation and research", and there it ends without making any provision for effective control of pollution. Another almost identical bill names the War Department as the beneficiary, and the others are equally futile. There is no sense in spending any more public money for investigation and research for its own sake, unless indeed it is

intended to cause interminable delay and defer action on real pollution control.

It is essential that we have federal control to handle effectively the pollution problem. When we study the nature of streams it becomes apparent that we must deal with them on a watershed basis and there is seldom any connection between watershed boundaries and state lines. The history of state efforts for effective control is replete with failure, and efforts to strengthen their inadequate and ineffective laws invariably meet with the eminently effective argument of "competitive disadvantage". In my own state of Pennsylvania, this same argument has successfully defeated every pure-streams bill introduced, and that covers a period of more than fifty years. But when we consider federal control, this argument evaporates into thin air and all industries are placed on a level competitive basis.

There is no use talking about voluntary action or persuasion unless backed up with mandatory powers, for human nature is not imbued with any great amount of altruism in spite of meaningless pronouncements to that effect. Municipalities and industry alike are too absorbed in their own fiscal problems voluntarily to spend their own money for the benefit of their neighbors—and perhaps a hated competitor—below them. However, from a broad public standpoint, effective pollution control would not cost a thin dime. There would be a different distribution of costs, to be sure, but the public is already paying for it with interest through the costs and losses incident to polluted water, but the only thing it is getting for its money is bacteriologically safe fluid from the water faucet. On this point, the Water Pollution Report of the National Resources Committee says: "It is needed—to bring about a public realization of the fact that *clean streams represent an economic value* to the community which would *more than offset the cost of the necessary treatment works*".

When other arguments are exhausted, the opponents

raise the cry of "unconstitutional". There seems to be ample precedent for federal control in such examples as the Interstate Commerce Commission, G Men from the Department of Justice, the control of migratory birds by the Department of Agriculture, animal and plant quarantines, the radio, the airplane and others. With the single exception of migratory birds none of these activities so plainly demands federal control as the running water of an interstate stream with its attendant load of pollution. It is a one-way interstate transportation system on which the downstream communities pay all the freight. There is a close analogy between flood control and pollution control, and with all the proposals for outright federal control of floods, I have never heard any question of constitutionality.

Pollution control must be mandatory, but it must be fair. In order to be fair and equitable, it must be administered nationwide on a uniform basis according to watersheds and not state lines, and federal control is the only way that this can be effectively accomplished. The passage of the Lonergan Bills, S-3958 and S-3959, presents the fair and logical solution to this problem that has outstripped the best efforts of all existing agencies. Remember that the opposition is well organized, well financed, and actively opposing the bills by direct action in Congress and indirect public propaganda. Don't be misled by this propaganda and don't be confused by the subterfuge bills. Senator Lonergan's bills are now in the hands of the Senate Commerce Committee, consisting of Senators Caraway, Gibson and Guffey. If you are really interested in pure streams, not just in lip service to the cause, make your wishes known to this committee, to your own senator, and above all to your congressman before he comes up for reelection this fall by asking him: "Will you vote for the Lonergan Pure Streams Bills?". They will be out on the floor for a vote at the beginning of the next session.

AMERICAN WILDLIFE
INSTITUTE

This organization, "formed to bring about full cooperation of all wildlife interests in North America, to the end that effective national and international programs for the restoration of game, fish, other wildlife and their habitats may be developed and maintained", is soliciting funds in support of its program. The address of the Institute is Investment Bldg., Washington, D. C. The ten classes of membership, with the amounts to be contributed annually, are listed as follows:

Endowment Membership.....	\$10,000 (or more)
Patrons, not less than.....	\$1,000
Sustaining Members	500
Contributing Members.....	100
Supporting Members	25
Active Members	10

Members	5
Sporting Goods and Hardware Jobbers, not less than	10
Sporting Goods and Hardware Dealers, not less than	5
Organized Hunting and Fishing Clubs (not conservation organizations).....	25

All members are to receive the Institute's magazine, American Wildlife, and a year's subscription to one of the following:

American Rifleman; Field and Stream; Hunter-Trader-Trapper; Hunting and Fishing; National Sportsman; Outdoor Life; Sports Afield; Sporting Goods Dealer; Sporting Goods Journal.

We present this without further comment.

Mammal Society Meeting

By EDWARD A. PREBLE

THE EIGHTEENTH annual meeting of the American Society of Mammalogists convened at Philadelphia, Pa., May 12 to 16, 1936. Since its establishment in 1919, as a result of an informal meeting of a number of students of mammals held at the home of Vernon Bailey in Washington, D. C., this society has built up a membership representative of many interests, and scattered over most of the settled parts of the world from Argentina to Alaska, and from South Africa to Norway and Siberia. Its interests cover a wide range of activities, which fortunately include efforts to conserve the objects of its study.

The meetings this year were held in the lecture hall of the Academy of Natural Sciences of Philadelphia, among the oldest of American organizations devoted to Natural History, where Charles M. B. Cadwalader, managing director of the Academy, addressed the Society at the opening session on May 13. The reading of papers followed, and was continued at morning and afternoon sessions through May 15. On Saturday, May 16, the members visited the Zoological Gardens. At the principal business meeting, most of the officers, including the president, H. E. Anthony, were re-elected for the following year.

The papers presented covered a wide range of subjects, in conformity with the varied interests of the membership. There were discussions on anatomy, osteology, ecology, geographic distribution, food habits and the status of threatened species in North America and other regions.

Since consideration of all the papers is impracticable, comment will be limited to a few particular ones, with a leaning toward those involving conservation of mammals.

The Committee on Marine Mammals, Dr. T. S. Palmer, Chairman, announced that the Treaty between the United States and other countries for the regulation of whaling, which was concluded at Geneva on September 24, 1931, has now been ratified or acceded to by the nations interested, and awaits only the passing of enabling acts by some of the countries to make it effective. The United States has recently passed its enabling act.

The treaty provides for the annual licensing of whaling

ships, factories, and shore stations, forbids the killing of female whales that are suckling young, or the young ones accompanying the mothers, limits the size of animals that may be taken, and provides that the entire carcass, within certain limitations, must be utilized. All the whalebone whales are protected, but porpoises and dolphins are not included.

The initial steps in formulating protective measures were considered in 1929 by representatives of governments participating in the Norwegian conference on whaling, who expressed their serious concern at the increasing magnitude of whaling operations in the Antarctic, which, they felt, had reached such proportions that the introduction of restrictive measures was urgently required if the future of the whaling industry was not to be gravely endangered.

The operating whaling companies realized that the stock of whales was being rapidly depleted. Norway and Great Britain being the leading whaling nations, the companies operating under their flags induced their respective governments to initiate conferences. This led in part to the Norwegian whaling act of June 21, 1929, and finally to consideration for action by the Economic Committee of the League of Nations. Several years ago a committee of the Mammal Society undertook to effect better protection for whales in American waters. At a meeting of the Society on April 11, 1928, papers were read by various members, and a council for the protection of whales and other marine mammals was organized. A. Brazier Howell was executive-secretary, and the Technical Committee in-



H. E. ANTHONY, PRESIDENT OF THE AMERICAN SOCIETY OF MAMMALOGISTS AND CURATOR OF MAMMALS AT THE AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK

cluded Theodore S. Palmer, Remington Kellogg, Glover M. Allen and Gerrit S. Miller, Jr., all of these still comprising the membership of the Society's Committee on Marine Mammals. They were supported by an advisory board that included a number of the leading North American scientists and conservationists. The activities of the Council having been brought to the attention of Lucius M. Eastman, who represented the United States on the Economic Committee of the League of Nations, he asked the Mammal Society to nominate a person qualified on whaling matters to represent the (Continued on page 64)

HORICON MARSH HISTORY

HORICON MARSH, in southern Wisconsin, originally the water hunting ground of the Winnebago Indians, was dammed and made a lake in 1845. For years it provided rich harvests of fish and game. Then, in 1867, after years of litigation, the state sold the forty thousand acres of land that lay under its water to a promotion company, for five cents an acre. The dam was removed, and Winnebago Marsh was again revived. Once more it became a hunting and fishing resort.

Then, about twenty-five years ago, the marsh was drained, and the dried land was sold for farming purposes. When this dream failed, efforts to restore the marsh were instituted by the Izaak Walton League. Now, after years of effort, success seems to be in sight.

The sad history of Horicon Marsh is told by Louis Radke of Horicon, Wisconsin, a member of the Izaak Walton League, in an attractive twelve-page pamphlet.

I MET A MAN

By THE KEEPER OF THE MANSION

I MET a friend the other day, a man of unusual powers of soul; a robust man to whom an injustice to the weak was a crime not to be tolerated, and who had the courage and backbone to resent it and defend the weaker brother, whether man or beast.

On my walk through the woods with him, I became aware of his many sided nature. His keen senses seemed to perceive everything; the slightest sound from the air, the least unusual noise on the ground, a peculiar condition of Nature arrangement—all were immediately perceived, analyzed and clarified. And what a wealth of insight he possessed! His range of thought ran through every phase of human activity and his knowledge of Nature was intimate.

We were skirting a wooded hillside. To the left of us lay a meadow-valley, through the center of which ran a spring branch, heavily bordered with shrubbery. Suddenly there was a discharge of guns from the valley below. The yelp of a dog followed, then the yell from one of the hunters to his companion—"You got him!" My companion's lips tightened and his face wore a strain of pain. He was looking in the direction of the hunters. I perceived his distress and ventured a remark about "sport". "This kind of sport," said he, "is what remains in man from the days of his savage ancestors. Often he kills for 'sport', not for food required; his intelligence has not risen sufficiently to overcome his desire to pursue and dispatch his quarry. It is a pity."

I thought of a book, on the delight of hunting and fishing, which I read recently. In it there is a chapter devoted to "Sentimentalists". Could it be that such a man

as my companion can, by any stretch of imagination, be put into this category? It seemed impossible.

AN INTERNATIONAL FOREST PARK

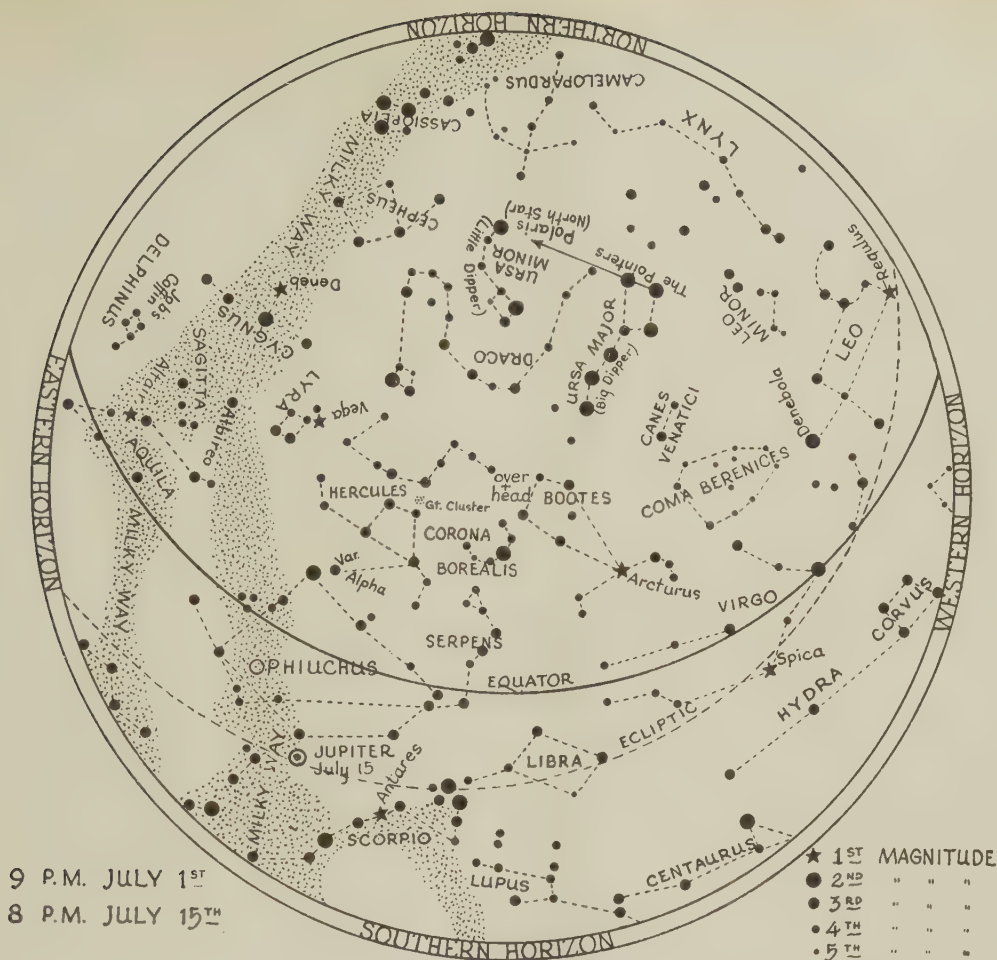
ERNEST C. OBERHOLTZER, President of the Quetico Superior Council, announces that authorization was recently granted by the National Forest Reservation Commission to extend Superior National Forest through the remainder of the Shipstead-Nolan area. This enlarged forest, an immense tract in the Rainy River watershed in Minnesota, would be the American contribution to what, combined with Quetico Provincial Park in Ontario, would become a great International Wilderness Park. Unfortunately, funds are now lacking to purchase the tract needed, and final arrangements with Canada are still to be consummated. But Mr. Oberholtzer, whose efforts in behalf of this worthy project have involved several years of almost unbelievable personal sacrifice, is greatly encouraged.

We hope that funds will be forthcoming to add the needed area to the Superior National Forest, and that eventually the long battle waged by Mr. Oberholtzer and his associates in behalf of this project will be crowned with success. In forthcoming issues of the magazine we will present some views taken within the Quetico area that illustrate a few of the beauty spots abounding in this outstanding stretch of lake and forest country, described by outdoor enthusiasts as "rivalled by few other areas in the world".

THE SANCTUARY NEWS

WE HAVE received Volume 1, Number 1, of The Sanctuary News, published by the Lucy Audubon Society of Mt. Kisco, New York, and edited by Orlando Weber, Jr., of 22 East 82nd St., New York City. It includes among its contributors the late Warren F. Eaton, Eugene Swope, Roger T. Peterson, Elizabeth M. Richmond, and its very alert and talented young editor.

The object of this new recruit in the field of Conservation seems to be the education of the Nature-minded public in the higher values of Nature's works. Pending the time when those really interested in preserving our vanishing wildlife and botanical resources for their highest use by all our people, may band together to fight the selfish interests that are now destroying these resources, such publications will fill a vital need in numberless sections. In fact, it might be fatally optimistic to assume that the time will ever come when the influence of such vehicles for the expression of conservation aims can be dispensed with. We wish this little brochure the success it deserves. We find no fault in it. E. A. P.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

A Sun Smaller Than the Earth

By ISABEL M. LEWIS

AMONG many strange objects in the heavens none are more unusual than the white dwarf stars, several of which are close stellar neighbors of the solar system.

The companion of Sirius, only nine light years away, is the best known of these tiny suns, but the most exceptional of all of them seems to be the star that is known only by its catalogue number of A. C. +70° 8247. A special study of this star as well as other white dwarfs has been made by Dr. G. P. Kuiper of the Harvard College Observatory, and some strange facts seem to be fairly well-established about this most peculiar little body.

A.C. +70° 8247 is probably not more than about half as great as the planet Earth in diameter, or about the size of the planet Mars, and is the smallest sun known. Several other white dwarfs are of planetary size and the companion of Sirius, called Sirius B, has a diameter about $3\frac{1}{2}$ times that of the earth. All of these bodies are tremendously

dense and abnormally heavy for their size compared to the average star. They are believed to consist of atoms that have been stripped of their electrons leaving only the nuclei or protons closely packed together.

It is estimated that this smallest of stars has an average density *about 36,000,000 times that of water and a central density one billion times that of water.* This would make the amount of matter in the star average 620 tons to the cubic inch, as compared to about one ton to the cubic inch for Sirius B. As Dr. Kuiper has pointed out, it follows that if this star had a companion star close to its surface the gravitational attraction of the central star would be so great that the companion would complete one revolution around it in two seconds. Unless the companion were also a dwarf star of great density it would be disrupted by the tidal strains produced in it by the attraction of the greater star. The surface gravity of this star is 3,400,000 times

that on the surface of the earth, Dr. Kuiper states, and for every foot increase in altitude above the surface of the star the pressure of layers of its atmosphere would increase four times, so that at a height of fifteen feet it would be increased a billion times. As a result the entire atmosphere of the star can scarcely extend to a height of more than twelve feet above its surface.

A.C. +70° 8247 is a faint star of the 13th magnitude and its distance from the earth is probably about fifty light years. It is one of the bluest and hottest stars in the northern sky with a temperature estimated by Kuiper to be about 28,000 degrees absolute. It is remarkable that it shows no lines whatever in its spectrum such as would be due to absorption by hydrogen or other gases in its atmosphere, though if such lines did exist they would certainly be detected. It has a continuous spectrum such as would come from an intensely hot body if it were not surrounded by an atmosphere of cooler gases.

This star is so different from the average star, which has a density comparable to that of water, that it appears hardly sun-like in its nature. These white dwarfs, among which it is classed, representing, as they do, matter in the state of greatest known density, are the exact opposite of the red super-giant stars which are, on the other hand, so rare in density that a cubic inch of their substance would contain less matter than a vacuum tube of the same size. These same super-giant stars are so huge in bulk that our own sun is dwarfed into insignificance in comparison with them. At the center of our solar system one of them would fill all the space within the orbits of the inner planets, even as far as Mars.

If, on the other hand, this tiny dwarf sun were at the center of our solar system in place of our own sun, it would appear, as viewed from the earth, only as a brilliant and extremely hot point of light. Yet its mass, which is nearly three times the total quantity of matter contained in our own comparatively huge sun, would give it a gravitational pull upon our planet so tremendous that the length of our year would be shortened to less than eight months. Life, however, could not long exist upon the earth if dependent upon such a sun for light and heat. Although for equal areas of surface a far hotter body than our sun, it is so small in total radiating surface that the amount of heat and light received by the earth would be several hundred times less than that which we now receive from the sun. On the whole we have good reason to be satisfied with the sun that is now furnishing us our daily supply of light and heat. It is, to be sure, also classed among the dwarf stars though it has

a diameter that is over 864,000 miles in extent. If we had in exchange one of the super-red giants we would be quite as badly off as we would be with the white dwarf for a central luminary, for the earth would either lie uncomfortably close to the giant sun's surface or even beneath it.

How many of these small tremendously heavy little suns exist in the heavens we cannot estimate because they are so faint that only the nearest of them can be detected. Of the five or six found and studied so far several are known to be companions of other stars. Why the matter of which they are formed should exist in such a strange state unlike any with which we are familiar, while the stars with which they are associated are quite like other stars, is a puzzle. Our planet Earth, the heaviest body in the solar system, has a density about $5\frac{1}{2}$ times that of water. The densities of five of these white dwarfs

range from 40,000 times that of water for the companion of Sirius, to 36,000,000 times that of water for this smallest known sun.

A pinch of the stuff of which such stars are made would crush us to the ground, if it should fall upon us. Matter in such a state is unknown on earth and probably rare also among the stars.

In the month of July, Vega, Arcturus, Spica, Antares, Deneb and Altair are the first magnitude stars in the evening sky. Corona, The Northern Crown, is now high overhead, between

Bootes and Hercules. Scorpio and Sagittarius in the far south are two of the finest summer constellations, while in the far north Cassiopeia, the Big Dipper and Draco are the most conspicuous.

Both Mercury and Venus are not well placed for observation this month as they are too close to the sun. Mars, in the morning sky in Gemini, is still too near the sun to be seen.

Jupiter is now in Ophiuchus, a few degrees northeast of Antares in Scorpio. It is in fine position for observation most of the night and may be seen in the eastern evening sky immediately after sunset.

Saturn on July 4 will reach a stationary point in its motion with respect to the stars and will then start to move westward, or retrograde. It still appears ringless in the telescope early in the month, but one must be up in the small hours of the morning to observe it.

There will be a partial eclipse of the moon on July 4 of small magnitude, visible in Australia, the South Pacific Ocean, Africa and other far distant parts of the world. On July 3 the earth is in aphelion or at the point in its orbit farthest from the sun.

As we go to press Mrs. Isabel M. Lewis of the United States Naval Observatory and Astronomy editor of Nature Magazine will be located in southern Siberia near the Caspian Sea, U.S.S.R., where she should be able to observe the total eclipse of the sun. This occurs June 19, the shadow touching the earth at sunrise in the Mediterranean Sea, and passing over Greece and Turkey in the early morning. Crossing over southern Russia and Siberia, the moon's shadow will leave the earth at sunset in the northern Pacific. Mrs. Lewis will give an account of this sky spectacle in Nature Magazine, when she returns to the United States.

Trailside Treasures

THE MYSTERY DEEPENS

By JANE ADAMS PARKER

"HOW MANY things there are to find out about animals!" said Jackie. He was lying down on the warm grass before a long, low cage in front of Grandpa Arnold's garage. "I was watching your corn snake for ever so long, wondering why he didn't blink in the sun. Then your Aunt Dot said he had no eyelids to blink."

"The poor thing was almost blind this morning," said Jerry, sitting down beside Jackie. "Snakes get a thick film over their eyes before they change their skins, because the skin over their eyes comes off too. See, he's turned his old coat wrong side out, and has crawled almost out of it. Don't those big crimson and black patches shine though? He sure is a beauty!"

"Here are the folks now," said Jackie in a thin voice. "I hope you all have a good time on your treasure hunt."

Jerry jumped up and put a quick hand over his mouth to hide his wide grin. Then standing in a row the three children, Rosy, Jo and Jerry sang in a gay little tune, "We're going to take Jackie treasure hunting with us. We are, we are."

And Grandpa Arnold and Aunt Dot said together, "We sure are, Jackie-boy."

It was a little surprise they had planned.

"Oh! That's fine!" said Jackie, as Jerry helped him into his chair. "PLEASE nobody pinch me, if I'm dreaming. I'm too happy to wake up."

The woods rang with their lively voices as they trudged along the trail to a clump of white oaks near Willow Stream. Grandpa wheeled Jackie's chair into the shade and the rest sat down near by.

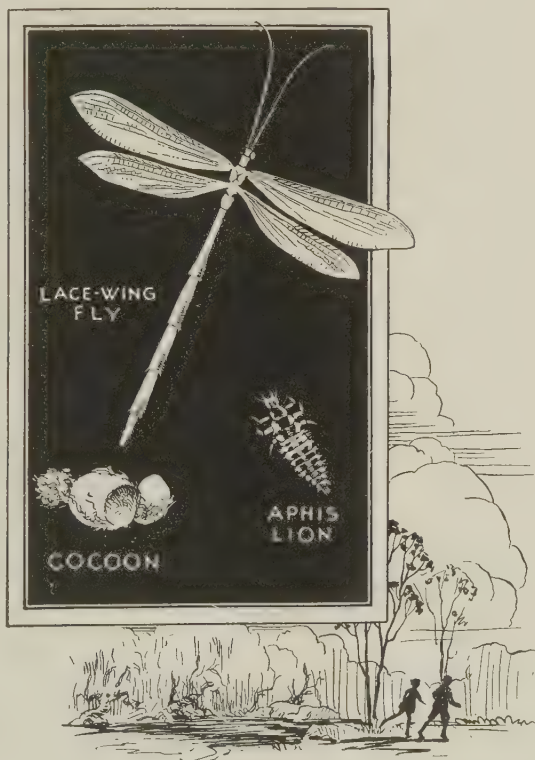
"Isn't it great in these woods?" said Jackie. "I noticed so many things. See this funny little bug I picked by the side of the path. How fast he runs! And—and what big jaws he has when you look at him under the glass!"

"That's an aphid lion," said Aunt Dot. "It's the larval baby of the dainty lace-wing fly. Most likely he's running about looking for his lunch. When he finds some aphids or maybe another little insect he

likes to eat, what do you suppose he does?"

"Chews it up," Rosy guessed promptly.

"He makes a little hole in it with his mandibles," said Aunt Dot. "Then he raises it into the air and lets all the sweet juices trickle down into his mouth."



"It sucks insects' eggs too," said Grandpa Arnold. "That's why Mrs. Lace-wing first spins a little silken pillar and lays her egg on top of it. Then she spins another and so on, until all her eggs are high up out of reach. If she didn't the first baby that was hatched out would eat up all of its brothers and sisters before they were out of their shells. Here are some now on this leaf."

"They look like a tiny fairy forest," said Rosy, "with an egg on top of each tree."

"How does the aphid turn into a lace-wing?" asked Jo. "Just presto change, like the mayfly grub changes into the mayfly."

"The aphid spins a cocoon out of silk," said Aunt Dot, "that opens like a little box when the fly is ready to come out."

"The lace-wing generally hides away in the daytime," said Grandpa Arnold. "Maybe if you whip up some of these tall grasses you might find one. You'll know it by its four, pale green, lacy wings, and round eyes that look like golden beads."

"Why Grandpa," said Jo, as she dove down into

a tangle of grass hunting for a lace-wing, "here's an old candy box full of birds' eggs."

"And here's someone's knife," said Jerry, "right where you picked up the box. That's the very one Tommy Higgins had in school yesterday."

"Oh dear," Rosy began to count sorrowfully, as Jo held out the open box, "one, two-fifteen, little birds that never will sing. Isn't it too bad!"

As they bent over the box, a sharp whistle sounded from somewhere across Willow Stream, and suddenly a great shaggy dog bounded out from the path and into the deep woods.

"Quick," directed Grandpa Arnold, "Jerry, you and I had better go over to see who is calling that dog. You girls stay with Aunt Dot and Jackie."

"Jerry," said Jackie, "don't you remember? That's Johnny Barlow's dog, Prince."

(To be continued)

Whom did Jerry and Grandpa Arnold find on the other side of Willow Stream? Will they find the boy who has done all the mischief? Who do you think it is? Send in your guess to Uncle Dick.

TOBY

By R. NELSON

THIS is a little story of a little bear. In fact, he might have been one of the Three Bears. It might have been from the very House in the Woods that Goldielocks visited that he strayed, one fine spring afternoon, playing for hours in the warm sunshine. There was nothing to warn him that the innocent-looking brushpile meant danger to him. So he reached for a tidbit near the top. There was a snap, and he found he was caught in one of Man's cruelest inventions, a steel trap. Only the forest could then tell what happened—the hours of vain efforts to escape and the night of suffering. The morning sun saw a Conservation Officer release the almost lifeless bear cub. Then came a drive to the nearest town. There the little bear was turned over to a veterinary. But it was too late. The leg had to come off.

While he was getting well, Toby, as he was named, found many friends in the new world in which he now lived. Even the grownups would try to pass him candy, when they thought no one was looking. Every little girl in the neighborhood fell in love with him and wanted to take him home, "just to play with." For these many friends, Toby paraded every afternoon, and graciously posed for his picture, seeming to take pride in his operation.

Toby's future has been taken care of. He is to be sent to a private game preserve, where he will



grow to maturity in company with many other animals, although he will be slightly bothered by the fact that he has only three legs. It is too bad that there is no way of letting him know that never again will he pass through the terrible experience of being caught in the jaws of a steel trap.



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WILL YOU HELP TO EDIT NATURE MAGAZINE?

Nature Magazine is the voice of the American Nature Association. It seeks to achieve the Association's aim of stimulating public interest in Nature and the conservation of wildlife, forests and the scenic outdoors. The magazine should reflect the considered opinion of the majority of the members of the Association and readers of the magazine.

Editing a magazine is often somewhat like shooting arrows into the air. The editor can not always be sure where the literary arrows he fosters are going to land. A few readers, when they have read an article they enjoy, or who like a particular feature, write letters of commendation and appreciation. More take their pen in hand when the editor makes a mistake. But neither gives much specific idea of what is liked or what is not liked.

Since its first appearance in January, 1923, Nature Magazine has changed and developed. Some of these changes—such as the Rotogravure Section—the Conservation Department, the Hiking and Camping Forum, are of comparatively recent origin. But how do these developments appeal to our members and readers?

We can best answer that question by asking questions. To accomplish that we have published on the other side of this announcement a questionnaire of purely editorial character. A limited number of these questionnaires are being mailed out separately, but we want to give all of our members an opportunity to express their views.

So, if you will turn the page you will discover what we regard as fundamental questions, the answers to which you alone know. If you will consider these carefully and answer them frankly, you will be aiding us to make the work of the Association more effective. If you wish to expand any answer just use another sheet of paper.

Thank you,

ARTHUR NEWTON PACK

President, The American Nature Association

P. S. We have arranged these pages so that you may answer the questionnaire without impairing any editorial matter in the magazine.

How long have you been reading Nature Magazine?.....

Has your interest in it increased?.....Decreased?.....

NOTE: When answering the following kindly rate them in the order of interest or importance to you, viz., 1, 2, 3, 4, etc.

Are you primarily interested in it for the section devoted to general Nature articles?.....; Rotogravure Section?.....; Conservation Section?.....; Photographic Department?.....; Hiking and Camping Forum?.....; Juvenile Department?.....; Other feature?.....

What is your major Nature interest?

Birds.....Mammals.....Flowering Plants.....
Trees.....Fishes.....Reptiles and Amphibians.....
Geology.....Insects.....Astronomy.....Conservation.....Education.....or.....

NOTE: The following questions may be answered "Yes" or "No," but it would be helpful to the Editors if you gave them the benefit of your reasons for the answers.

Would you desire more articles of particular use to teachers?..... Are you a teacher?..... If so, do you find the articles useful?.....; the Conservation Section useful?.....; the School page useful?.....Other feature?.....

Would you prefer the present 64-page magazine *with* advertising?.....or a 48-page magazine without advertising?.....

Do you know of people who would like to join the Association and receive the magazine if the dues were two dollars instead of three?.....

Do you prefer informative articles?.....; records of original observations?.....; inspirational Nature essays?.....; any special type of article?.....

Should we use a limited amount of good original Nature poetry?

Would you rather have the Rotogravure Section as now edited or would you prefer more articles *in place* of it?.....or in place of a part of it?.....

Do you feel the Conservation Section serves a valuable purpose?.....Would you change it?.....

Suggestions for improvement:
.....
.....
.....

Is the Juvenile Section of interest in your family?.....Does it take too much space?.....Or too little?.....

We will be aided in forming conclusions as to geographical and professional interest if you will give us your name, address and occupation. However, do not sign if you have objections.
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PHOTOGRAPHIC NOTES

(Continued from page 3)

pensive to operate and highly efficient. Further details are available from Burke & James, 223 W. Madison Street, Chicago, Ill. Please mention Nature Magazine.

* * *

An interesting item has just come to this writer's attention. In a recent contest conducted by the American Newspaper Publishers Association and the Associated Press, it was revealed that all of the prizes, including the twenty regular prizes and the grand prize, were won by photographers using Graflex made cameras. This is particularly interesting in view of the fact that the Graflex cameras are American made.

* * *

Burleigh Brooks, 127 W. 42 St., New York, N. Y. have announced the first issue of *Rolleiflex Photography*. This periodical is to be published quarterly and priced at 15 cents a copy. Subscriptions will be accepted at the rate of 60 cents a year. Of eight articles in the first issue, no less than four are related to Nature photography. Address the above company for subscriptions or further information.

Pictorial Lighting (\$2.00) and *Projection Control* (\$1.75) by William Mortenson. Published by the Camera Craft Publishing Co., 425 Bush St., San Francisco, Calif.

For many years Mr. Mortenson's name has been linked with portraiture that has a fine distinctive individuality. His work has attracted attention in all of the important photographic salons. Photographers with a desire to learn Mr. Mortenson's methods have persuaded him to write *Pictorial Lighting* and *Projection Control*. In the former he describes his system of lighting which, if diligently practised, will improve anyone's technique with the camera. Hand in hand with his lighting system, many of Mr. Mortenson's unique effects are achieved by a method of control in projection. This is described in detail in *Projection Control*. Many before and after illustrations show exactly what may be accomplished with the proper use of projection control. This writer has benefited considerably from Mr. Mortenson's books and recommends them for the photographer's book shelf.

* * *

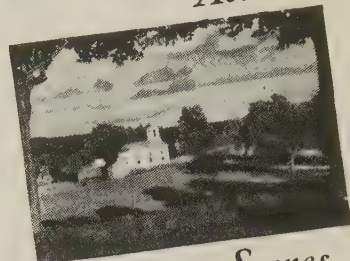
A new series of four booklets on motion picture photography have been planned by the publishing house of Moorfield & Shannon, Nutley, N. J. The first two in this series, entitled *How To Make Money With A Movie Outfit* and *Money Saving Tips For The Amateur Movie Maker*, have already made their appearance. They sell for 15 cents and 25 cents respectively. Highly interesting, instructive and practical, they should find a place on the shelf of every movie enthusiast.

The same publishers have produced *Free Lance Writing For The Magazines*, selling for \$1.00. It explains how to prepare and submit photographs and manuscripts for publication. A good handbook for the person interested in this line of endeavor.

One camera for every purpose



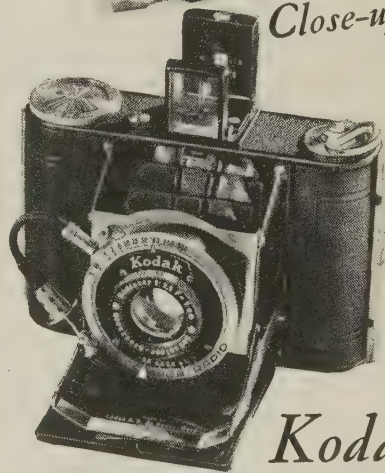
Action



Scenes



Close-ups



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Nature Magazine in School

A Department of Aid to the Teacher

The Venus Flytrap

Can you imagine anything more interesting than an exploring expedition with your child to find these wonderful plants? This article will tell you where to go and a number of interesting facts about this plant. It is fun to experiment with a Venus flytrap to find out what stimuli will affect it. It is said that if two adjoining hairs are touched or any one hair in rapid succession that the halves of the leaf will close on the object even if it is as fine as a hair. At first there is a slight space between the trigger hairs and an insect as small as a very small ant can sometimes escape. However this space soon closes and so firmly do the two halves of the leaf come together that the outline of the insect within is plainly visible. It would be worth while to try to determine the relative sizes of the captured insects, if there is an area around the trigger hairs that exudes a substance to which insects are attracted, if an insect has to be large enough to touch the trigger hairs before the trap will spring, and if a small morsel of hamburger substituted for an insect will also be devoured. Since the Venus flytrap is local, the more widespread sundew could be substituted in many places.

Burrowing Owls

Most vacationists will probably encounter some kind of owl. Those who visit Florida may find the owl described in this article; those who travel westward to the prairies may meet a close relative of this species, the burrowing owl of the plains. These ground owls are unlike most other owls in that they do not wait for complete darkness before hunting for food. The Florida species often leaves its hiding place at dusk. Both the southern and western species of burrowing owls are decreasing in numbers, mainly because of the settlement of the country, and, unfortunately, because the birds are tame. Their tameness and the fact that they may be often seen in the daytime make them fine subjects for the nature photographer. Camp directors, as well as parents, can do much to substitute a feeling of kindness toward these birds instead of the attitude of dislike that many children have acquired. Birds of all kinds should be encouraged to live near camps and become the friends of the campers.

The Hyrax; What is It?

Vacation time is excursion time, and how the children of any family enjoy a trip to the zoo. On such an excursion when they are trying to understand more about the life history of some creature of the wild, it often happens that parents and children come to understand each other better. Parents do not always have to know the facts of the life history. The children like to contribute some of the information. This article indicates a possible technique for such an expedition and presents good points for observation, to be followed by reading.

In order that teachers and parents may further use *Nature Magazine* as an aid to the study of *Nature and Science*, this page is devoted to the following brief notes based upon articles in this issue and suggesting ways in which they may be used as a source of inspiration and information. To bring these *Nature* study thoughts to our readers we have obtained the services of one eminently qualified for the task, and this department is edited

BY ESTHER SCOTT

Instructor in charge of Elementary Science
Washington, D. C., Schools

Sea Anemones

If it is possible to do so before taking a trip to either the mountains, the plains or the seashore, the museum should be visited to introduce the children and perhaps some of the adult members of the family to the animals and plants to be found in the new environment. Habitat groups such as the one described in this article present a very clear idea of what can be seen. To those who expect to visit the seashore this article, dealing with sea anemones, is of special interest. The common New England species may be found at ebb tide attached to rocks and to wharves. All these species of beautiful sea animals are related to the corals, but do not have the limy secretion. These flower-like sea creatures are easily identified by their cylindrical shape, being about as broad as they are high, with the lower portion attached to some object and the upper part, the slit-like mouth, surrounded by tentacles. The tentacles, usually occurring in multiples of six, are equipped with stinging cells that render the victim helpless so the "lasso cells" may drag it into the mouth. The simplicity of the body structure of this animal, as well as its method of reproduction, should be pointed out to children to give them a background for understanding some of the life processes of more complicated creatures.

Argus Eyes Under the Microscope

To those children who enjoy tinkering with a microscope, this article opens an interesting field of investigation. To those whose interests lie more in field work, it suggests answers to questions regarding the marksmanship of the dragonfly in seizing its prey, and how near an insect has to be to attract the attention of a dragonfly. In lessons about this insect it should be pointed out that this is a beneficial creature, regardless of the superstitions concerning it.

The Bishop's Cap Cactus

What would be more fun for a child than to make a cactus garden as a vacation project with his parents. In such an undertaking lack of planting space need not be a serious con-

sideration. A cactus garden may be developed in a dish! Whether it is decided to locate the garden outdoors or indoors, a sunny location should be chosen and the soil prepared. The type of soil suggested in this article is easily obtained, and plants may be purchased from cactus growers. Aside from keeping the weeds pulled out this type of garden needs no other care once it is started. After a rain it would be interesting to look at the "Bishop's Cap" and see the effect of the moisture on the appearance of the ribs. As these plants are about three years old before they bloom, which of course is young for a cactus plant, it is a project that calls for patience as well as industry. The flower and the seed formation are worthy of attention. About three weeks after the flower opens, the plant should be closely watched. The seed cap to which the withered flower is attached will open rapidly, taking only a few hours to reveal the bare seeds.

Bats as Pets

"I was pleased to find an article about bats as pets in the recent number of *NATURE MAGAZINE*," writes Ursula I. Paine of Harwich, Massachusetts. "I feel that most people do not appreciate the little fellows.

"There were large air-shafts in the school building where I taught for many years, and each year, at the end of the winter, the janitors found bats at the bottom of the shafts where they had fallen from weakness. These were brought to my room by request, and, after a feeding of milk from a pipette, were tucked away between cotton pads to sleep in a dark, cool place. At first the little visitors chattered indignantly at the bit of glass thrust into their mouths, much to the pupils' amusement, but the hungry little stomachs soon learned, and then the daily lifting out of the soiled pads was a signal for pink mouths to open right willingly.

"I used to lift out the bats as one lifts baby kittens, by the nape of the neck. They were too sleepy to like to be disturbed except for feeding. Toward the end of April, they would take two feedings, one at morning and one at night. We tried raw beef but they seemed too sleepy to want to chew it. When they had had enough milk or beef juice, they would let us know by striking the glass rapidly with their teeth and scolding a little.

"When the nights grew warmer, I put the strawberry box with each little sleeper outside on the window ledge each night in a sheltered spot. Each morning, when we went to feed the little fellow and make him tidy, we wondered if we would find him there. There always came a day when the box was empty and our little friend had gone out to return our kindness by killing mosquitoes and flies.

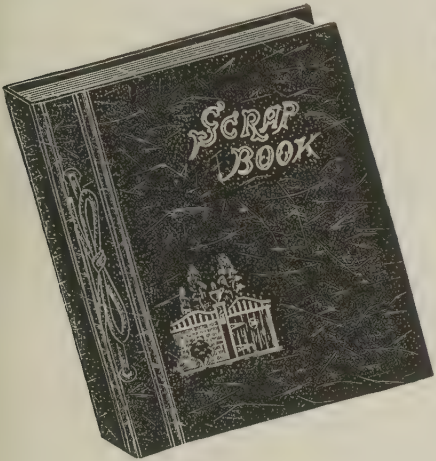
"I cannot tell how many bats we entertained in this way but not once did I ever find any vermin on the cotton covers that we used to cover them. The children learned for themselves that there was no truth to the silly legend so prevalent that bats get in your hair and have to be cut out."

When is the best time to Plant?
Will it grow best in sun or shade?
What soil does this plant like?
How do I combat this plant disease?
WHERE DID I READ THAT?

How often have you wanted some information on garden subjects and couldn't locate it at the time most needed.—Of course you read about the very thing you had in mind and you fully intended to clip the article out and save it for future reference.—You either misplaced the clipping or entirely failed to save the information for lack of a convenient place to keep it.

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Along Nature's Trails

"Along Nature's Trails", says the foreword, "has been written for everyone who loves the outdoors. Whether you are a Boy or Girl Scout, or a 4-H Club member, whether you live in the city or in the country, you will learn to know and to love better your outdoor friends through the pages of this book."

More or less complete biographies of approximately 150 plants, 100 birds, 70 insects and related creatures, 40 mammals, and 30 reptiles and amphibians, are given in the 330 pages that are devoted to these subjects. The subjects are classed according to habit, habitat or relationship. There are chapters on tracks, hibernation and migration. The seasonal aggregations are stressed. The interdependence of the component parts of fauna and flora is given attention, and the need for conservation, that all classes of people may enjoy their rightful share of Nature's bounty, is urged. After all, people are not likely to destroy the things they understand best.

There are about 200 line drawings mainly by Benson B. Moore. Lists of the State Flowers and the State Birds are given. The book is carefully indexed. *Along Nature's Trails* by Lillian Cox Athey, and edited by Edward A. Preble of the Staff of Nature Magazine, is published by the American Book Company, 1936. The price is \$1.20. The book will be helpful to young readers.

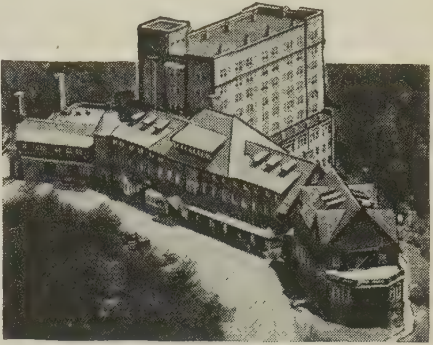
The Garden Encyclopedia

This book, the work of about thirty authors whose articles have been edited and combined under the editorship of E. L. D. Seymour, is published by W. H. Wise and Company of New York. It contains 1400 pages, 750 illustrations, including 250 photographs, and about a million words. The entries, alphabetically arranged, range from Aaron's Beard to Zygopetalum, but they are more than a list of plants. One finds such subjects as Aeration, Agriculture Department, Alpine plants, Birds, Children's gardens, Garden walls, Layering, Enemies, Slugs, Tools, Webworm, and innumerable botanical terms; in fact, almost everything that may interest the gardener. We do not recall a work on gardening that packs more between the covers of a four-dollar book than does this one. E. A. P.

Mountain Neighbors

This little book, *Mountain Neighbors*, by Edith M. Patch and Carroll Lane Fenton, is the latest of a series of "Holiday" books initiated by the first-named author and published by the Macmillan Company. It comprises about a dozen and a half essays that are delightful stories of birds, mammals, trees and fishes that inhabit the woods and waters and peaks of our western mountains. Examples are Cervus, the Bugler; Barb Quill, the Porcupine; Dipper, the Water Ouzel; The Little Haymaker (Pika); Limber, the Pioneer Pine; and so on with marmot, bear, mountain goat, bighorn sheep, puma, rainbow trout, nutcracker, the jays, and the osprey. The book is for children, and the style well conceived. The illustrations are by Fenton. The price is \$1.50. E. A. P.

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Forum Publications

Cookery for Camp and Trail, a compilation of sources of information and supply. Since this publication was first announced, its form has been greatly changed. Instead of a mimeographed bulletin, it is a printed booklet, illustrated, containing many data available from no other sources. It lists practical books, tells the recipe and related literature available from food firms, gives sources of supply of cookery utensils and gadgets, (with a number of recommendations), and indicates where specialty foods may be obtained. Vacation food lists conclude the variety of contents. Price 25 cents per copy.

Pestiferous Months Ahead: Circular which lists remedies and antidotes for insect bites, poison ivy, oak and sumac poisoning and snake bites. Price 3 cents.

Let It Rain: Bulletin on being properly protected while hiking or camping in the rain. Gives clothing and equipment suggestions and listings. Price 10 cents.

Vacation Trips by Clubs

At this writing summer vacation trips plans of representative clubs are still incomplete, so the outline below should be regarded as tentative.

Forum readers interested in taking a vacation trip under non-commercial auspices will find that most of the clubs are liberal in their guest participation privileges. The aim of such a conducted trip is to afford the greatest pleasure to the greatest number of club members and congenial guests, who represent a diversity of tastes and physical inclinations.

In some cases, of course, the parties are limited in number, by reason of restricted transportation, commissary and overnight accommodations.

Mid-West and Northern

Minneapolis Municipal Hiking Club, 325 City Hall, Minneapolis, Minn. *Northern Minnesota*, August 16-30.

Prairie Club, 38 S. Dearborn St., Chicago, Ill. *Northern temporary camp trip*, starting August 8 for 2 or 3 weeks. Also operates permanent camps in Michigan and Indiana dune country, and in Palos Park Forest Preserve, Ill.

Northeast

Adirondack Mountain Club, Box 59, Capitol Sta., Albany, N. Y. Owns *John*

Brooks Lodge and *Adirondack Loj*, both adjacent to the higher Adirondacks. American plan accommodations.

Appalachian Mountain Club, 5 Joy St., Boston, Mass. *Summer camps* in session at Shelburne, Lake Winnepesaukee and North Chatham—all in N. H.—and Echo Lake (Me.), close to Acadia National Park. Periods of 1-2 weeks from June 30 to Sept. 28th. Also operators of the chain of huts in the White Mountains.

Green Mountain Club, Rutland, Vt. *Long Trail Lodge*, 10 miles from Rutland, operated on American plan. A base for one-day Long Trail trips.

Field and Forest Club, 3 Joy St., Boston, Mass. *Adirondack Mountains* trip, Sept. 5-19, with a Lake Champlain hotel as base.

Southern

Maryland Appalachian Trail Club, Ramacciotti Bldg., Hagerstown, Md. *George Washington National Forest*, West Virginia. Dates not chosen.

Western

Boulder, Colorado. Headquarters of the University of Colorado Hiking Club, Rocky Mountain Climbers Club and Colorado Mountain Club, Boulder Group. Varied program of week-end events open to guests.

California Alpine Club, % T. E. Pring, 9 Geary St., San Francisco, Cal. *High Sierras Pack Trip*, July 11-26. \$50.00.

Cascadians, P. O., Box 123, Yakima, Wash. *Chelan National Forest*, August 2-9. \$18.00.

Colorado Mountain Club, 422 Chamber of Commerce Bldg., Denver, Colo. *Lodore-Yampa Cañon Country*, Sept. 5-12. Also combining with the Appalachian Mountain Club with Teton trip, August 21-31. Camp base at Jenny Lake.

Klahhane Club, Box 126 Port Angeles, Cal. *Hurricane Ridge* near Port Angeles. August 16-23. \$10.00.

Mazamas, Pacific Bldg., Portland, Ore. *Glacier National Park*, August 1-16.

The Mountaineers, P. O., Box 122, Seattle, Wash. *Mount Rainier Pack Train Trip*, July 25-August 15. \$70.00.

Mount Baker Club, P. O., Box 73, Bellingham, Wash. *Galena Ski Cabin*, late July or early August, for 1 week.

Obsidians, % Cliff Stalsberg, Eugene, Ore. *Willow National Forest*, August 2-16. \$35.00.

Olympians, 309 E. 3rd St., Aberdeen, Wash. *The Olympics*, August 8-16. \$30.00.

Potomac Appalachian Trail Club, % Kathryn A. Fulkerson, 1015-15th St., N. W., Washington, D. C. *Glacier National Park*, July 27-August 14.

Sierra Club, 1050 Mills Tower, San Francisco. *Kern River High Sierra Region*, July 11-August 8. \$70.00 (full month), \$40.00 (2 weeks).

Sky Line Trail Hikers of the Canadian Rockies, Room 318, Windsor Station, Montreal, Canada. *Lake O'Hara* central camp as Canadian Rockies climbing base. August 7-10. \$20.00-\$22.50.

Spokane Mountaineers, % Ed Dennis, E502-23rd Ave., Spokane, Wash. *Cabinet Mountain Primitive Area*, July 19-26. \$17.00.

Wisconsin Go-Hiking Club, % Margaret Guest, 4477 N. Murray Ave., Milwaukee, Wis. *Glacier National Park*, August 16-30.

Virginia Vacation Suggestions

A concise description of the trails and shelters in the Potomac Appalachian Trail Club terrain is contained in the second edition of *The PATC and its Trails*, ten cents from 901 Union Trust Bldg., Washington, D. C.

A vacation possibility for the hiker who does not wish to carry full camping equipment, is a trail trip of 157 miles in 13 days, affording overnight accommodations of various kinds. This sector extends from the Susquehanna River (Pa.) to Linden, Va.

So many hikers now use the automobile to reach bases inaccessible by train or bus, that they will welcome the map of the highway approaches to the Appalachian Trail in Virginia. Harold G. Conger prepared it, while Myron H. Avery capably undertook the text part of the *In the Blue Mountains of Virginia* booklet, 15 cents from the PATC.

A map of the A-T from Trayfoot Mountain to Tinkers Mountain, the portion maintained by the Natural Bridge Appalachian Trail Club, accompanies a recent bulletin of this Lynchburg (Va.) group.

Last but not least, Virginia has 29 mountains over 4,000 feet high.

If New England Bound—

The hiker on a vacation with the family can, by careful and considerate planning, get in a few climbs without prolonged separation.

Non-hiking members might, for example, use the cog railway to the summit of Mount Washington and stay over-night at the clubhouse—virtually a hotel. Particulars in *Cabin Trails* folder, 3 cents from Ray A. Walker, Haverhill, Mass.

Appalachian Mountain Club's tenth edition of its *White Mountain Guide* is due from the press July first. Non-member price per copy is \$2.40. Mail orders filled from 5 Joy St., Boston.

A toll highway extends to near the summit of Vermont's highest, Mount Mansfield; while there's also a hotel. Procure a copy of *Vermont Lakes and Mountains*, gratis from Vermont Bureau of Publicity, Montpelier, Vt.

Ten miles east of Rutland is the comfortable *Long Trail Lodge* of the Green Mountain Club. It is approachable by auto. A fair compromise would be to spend one day with the family, take an all-day climb the next, thus alternating the days. GMC *Long Trail* guidebook sells for 53 cents, available from Rutland office.

Maine Forest Service offers the vacationist choice of 121 public campsites—80 in wild country, and 41 in organized townships. Registered guide law does not apply at such locations. Free literature from Maine Development Commission, Augusta, Me.

Acadia National Park (Maine) contains over 200 miles of trails and footpaths, offering all types of walks from the easy lowland kind to moderately strenuous mountain climbs. Free guides are available, if desired, at Bar Harbor information office. *Walks on Mount Desert Island, Maine* is a publication obtainable for half a dollar from Sherman Publishing Co., Bar Harbor, Me. National Park Service, Washington, D. C., offers a free booklet.

In the Maine Woods, Bangor and
(Continued on page 60)

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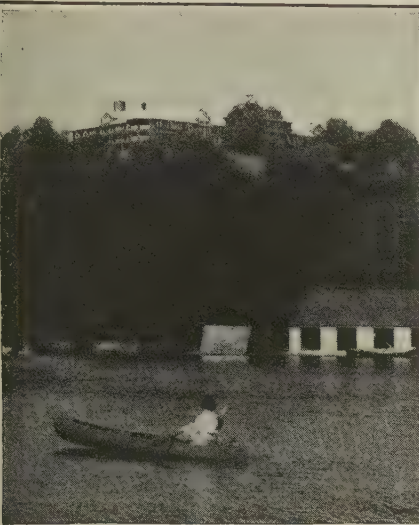
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Nature Poets, Attention!

The Chattanooga Writers' Club, Chattanooga, Tenn., announces their annual Nature Poem contest, open until November 1. The annual contest was established 12 years ago by Robert Sparks Walker, author and naturalist, in memory of his wife. Poems must be original and unpublished, and must be submitted anonymously, accompanied by a sealed envelope containing the name and address of the author. Complete details of the contest can be had from Mrs. J. H. Guenther, Chairman, 121 Ridgeway Road, Chattanooga.

New Botanical Club

The Southern Appalachian Botanical Club of West Virginia University recently has been organized for the purpose of stimulating the investigation and dissemination of knowledge concerning the flora of the region. The *Journal*, club publication, appears monthly except for the summer months from June through September and is available from the editor, Earl L. Core, at Morgantown, W. Va. The organizers of the Club hope that this publication will be the standard botanical periodical of southern Appalachian flora and that as such libraries of the area will desire complete files. The price to institutions is \$2.00 annually, the same as paid by members of the Club.

Aphid Spray

Perhaps you have wondered why certain poison sprays do not kill aphids (plant lice). It does not mean that the poisons have lost their effect, but rather that the aphids, through its manner of attacking roses and other plants, avoids the poison.

The aphid derives its living by inserting its spear-like mouth into the plant stem and sucking out the sap. Thus, it punctures through poison clinging to the outside of the stem and draws the sap from underneath.

It is therefore necessary to use a poison that kills by contact or by fumes to effectively control aphids or other sucking insects. Gardeners who spray early with "Black Leaf 40" find that they are able to avoid heavy infestations, giving their plants a much better chance to develop normally.

"Illustrated Flora"

The New York Botanical Garden this month takes over the distribution of Britton & Brown's long popular *Illustrated Flora*, which since its publication has been handled by Charles Scribner's Sons. *An Illustrated Flora of the Northern United States and Canada* is the full title of this three-volume work, in which 4666 species of flowering plants and ferns are described and illustrated. The Botanical Garden, whose founder and first director, Nathaniel Lord Britton, was one of the authors, his friend and associate, Judge Addison Brown, being the other, has had a new printing issued in conjunction with the Addison Brown estate. The set of books will be sold, as formerly, for \$13.50, and will be shipped postpaid by the New York Botanical Garden, Bronx Park, New York City.

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Hiking and Camping Forum

(Continued from page 58)

Aroostook Railroad annual, carries the illustrated advertisements of many of the Maine sporting camps, which are a boon and a blessing to Appalachian Trail hikers traveling light.

Among the literary contents are the 1935 Maine Appalachian Trail developments, clearly enumerated by Myron H. Avery; and a most readable account by R. M. Hayes of the largest party—sixty Ricker Junior College students and teachers—to make the climb of Katahdin. This bulky booklet costs 10 cents to mail—only charge made for it—from B. and A. headquarters at Bangor. New edition of Maine Appalachian Trail Guide is essential for any trip in this utter wilderness, and costs \$1.00 from the A-T Conference, 901 Union Trust Bldg., Washington, D. C.

Hudson Bay Canoe-Camping Vacation

Hudson Bay country broadly refers to that part of Canada which is north of the Canadian National railways main line between Quebec and Manitoba.

Time was when the Dominion government frowned upon nomadic trips here. Extensive mining and other developments have changed all this. Suppose the canoe-camper finds he has bitten off more than he can chew, either because of sickness, accidental loss of essential equipment or bad weather delays. To stick it out and return to civilization by the same primitive means he left it was the only course open to him in the past. Today he has modern transportation allies in the airplane, railroad and highway.

But outfitting stations are still few and far apart, so a generous allowance for emergencies is a wise precaution. Bulky loads must be portaged over rough trails. Only an experienced outdoorsman should travel without a guide.

The little booklet, *Canoe Routes to Hudson Bay*, carries conviction by its frankness. It does not hesitate, for instance, to refer to the troublesome insects in this land of muskeg. Free from Canadian Travel Bureau, Ottawa.

Unintentionally or otherwise, the *North-ern Ontario* booklet is cognizant of the hiker's preference for elevated wilderness. Northern Ontario rises, for the most part, from 1000 to 2000 feet. Its nearest point of contact with the sky is on Tip-Top Hill, 2120 feet, in the Fort William district. A most modest claim, considering that the Forum editor was taught in school that any elevation 1000 feet or more attained the superior status of a mountain! This booklet is free from the Department of Northern Development, Toronto.

It takes a pamphlet of 28 pages, exclusive of supplement and specimen sheets, to list the Dominion maps. Some of them are the new aerial strip type, nominally priced by the Topographical and Air Survey Bureau,

Department of the Interior, Ottawa, Canada. Any man imbued with the spirit of adventure, and the physical strength to endure hardships, will relish such a vacation.

Camp Cook Book from Missouri

Scouts, scouters and camp fire girls in Columbia, Mo., became dissatisfied with existing camp cookery manuals. They did not like the preponderance of stove cooking recipes, or the inclusion of those applicable only to large camp groups. While the menus were practical, they were often unpalatable.

So the lads and lassies, under the helpful direction of Mrs. O. R. Johnson, turned to and produced their own handbook. As a double check against failure, each recipe was given a pre-publication test over the campfire by local novices. The 66 recipes which survived the preliminaries comprise meats and cheeses, hot breads, one-dish meals, vegetables, drinks, desserts and cereals. General information is restricted to fire building hints, nutritive values of foods, and the use of wild fruits.

Mrs. O. R. Johnson, who is located at 411 Lathrop Road, Columbia, Mo., will mail a copy of the printed handbook for 20 cents.

July Gadget List

1. Another pre-cooked bean, packaged, is on the market. Quoted baking time, 20-30 minutes. Hot water and salt only additional ingredients needed. If mixed with slow-cooking meat, beans should be added later.

2. A quickly-prepared muffin mix, flavored with bran and honey. Only water needed in preparation. Estimated minimum baking time, 20 minutes. Recipe folder available.

3. A one-person aluminum cooking outfit, priced slightly under \$2.00, is listed in catalog of a Middle-West sports outfitter.

4. For the ladies there is a summer outfit, white and washable, of shirt and shorts, with separate wrap-around skirt which buttons in front.

5. Four models in play tents and log cabins included in *Play Hours* catalog of New York firm. Standardized pre-fit materials are supplied for one of the cabins, so that children can assemble it themselves. Models are *not* of doll's house dimensions, but are intended for juvenile occupancy.

6. For back road tramping in rural districts, where a heavy yet comfortable shoe is needed for comfort, Forum editor recommends a men's double-construction oxford. Inner part is a welt in itself, making rubbers superfluous. Shoe subjected to hard usage during fourteen months in Forum editor's home countryside, and has, with one resoling and heeling, retained its good appearance and serviceability.

Further information available on above products if a stamped addressed envelope accompanies the request.

Brevities

The Pacific Crest Trail System has its first local club, the Vagabond Ramblers, the organizers of which will offer their services as guides to juvenile groups using the trunk trail. . . . Historical hikes are specialized in by the Forbes Road Hikers, Greensburg, Pa. . . . Valley Forge was the destination of the eighth anniversary trip of the Back to Nature Hiking Club, Philadelphia. . . . Most common mistake in provisioning for mountainous country is to underestimate the amount of sweetstuffs. . . . But the FE can

hardly curb his curiosity as to what was in the "dynamite" soup—concentrated roll kind—served on a western trip. . . . New mode in felt emblems is to wear them as arm bands instead of on packs. Worcester section of Green Mountain Club, and Nature Ramblers of Philadelphia are doing it. . . . Lightest and coolest shirt worn by the FE on summer trips is of pongee silk. Let this may savor of dressing up, the shirt has been honorably retired from city service. . . . When time is a factor, it may help to know that a four-day hike can be completed in three days if camping is dispensed with. . . . Trail clearing English in New Zealand: "Leader to arrange for sharp slashes for clearing track." Further along, in this overseas bulletin, FE notes that a rental fee is attached to the slasher, "unless used for approved track cutting."

There must be considerable unapproved bush clearing in the Southern Alps to thus penalize the slasher welder.

Overseas Camping Periodical

Camping, monthly magazine of the Camping Club of Great Britain and Ireland, has been rejuvenated beyond recognition. A *Technical Number* heads the new and attractive series, but such a formidable title should not scare the camping novice.

The leading article lists the equipment taken on this year's Mount Everest Expedition. Knapsacks include a featherweight but sturdy model weighing six ounces; while another, chosen for high altitude work, has non-slipping shoulder straps. Even frequenters of the lesser hills would rally to the latter innovation.

A French hiker-camper expounds the gentle art of packing a knapsack, which, to be well-balanced, needs placement of heavy articles in the lower regions, preferably against the back. And he insists that it should be easy to gain access to everything in the pack; but that's too long a story to relate here.

Six shillings is the annual subscription to *Camping*, issued from CC headquarters at 38 Grosvenor Gardens, London, S. W., 1, England.

New A-T Objective

A noteworthy addition to the side trails system of the Mountain Club of Maryland is due to that genial supervisor, O. O. Heard, and his equally hard-working associates.

When its location significance becomes widely known, Center Point Knob will rob Katahdin and Oglethorpe of some of their glory. This Pennsylvania mountain summit of 1050 feet is exactly 1020 miles from either Appalachian Trail terminal.

Forking off from the A-T at Center Point Knob is the rugged White Rocks trail, which, when taken in conjunction with the Dogwood Run trail, makes a ten mile loop.

Auto parking point is Beavertown, nearly two miles from Dillsburg intersection of routes US 15 and Pa 74.

Poems

In *Dappled Waters*, by Roy Danford Parker, is a number of Nature poems worthy of the poetry lover's perusal. The book is published by the Poetry Publishers, Philadelphia, and is priced at \$1.50.

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National Parks by Air

Air-minded travelers visiting the National Parks this year will find airports readily accessible to every one of these scenic spots, the National Park Service, Department of the Interior, reports. Recent study of aeronautical maps has brought out the fact that landing fields already are available within an 80-mile radius of each of the National Parks. Lack of time need no longer be an obstacle to those with limited vacation periods who contemplate visiting public recreation grounds the width of a continent distant from their own homes.

Snakes and Turtles

Larry Tetzlaff lives in Kalamazoo, Michigan, is sixteen, and is bound to make zoology his life work. He has gotten a good start, having made a collection of more than one hundred reptiles. He is proudest of the three weeks spent in taming, and the month devoted to training, a banded water snake, and of having trained turtles to stand on their hind legs and take food from his hand. He is building up a splendid reptile museum, amassing interesting records and has already taken to the lecture platform.

Insect Workmen

Ancient Artizans, by S. W. Frost of Pennsylvania State College, treats of insects and their relatives as hunters, carpenters, masons, spinners, miners, paper makers, and so on, showing that these small creatures, which antedated man on the earth, had already learned to perform many kinds of work that man thinks he first thought of. To be sure, the tools that insects use are, with few exceptions, only their own organs, but when we realize that they bore in earth, wood, and metal, that they make traps, build and set nets, make paper, make and hang doors, raise plants for food, and use a pebble for a hammer, we must confess to wonder and admiration, and a reverence for a Power that we can never fully understand.

While the main purpose of the book is to pass on to readers, in simple language, the facts about certain insect activities, the author has not stopped here. There are extensive lists of books on Entomology, particular attention being paid to those published during the last twenty-five years; and following each chapter there are further lists of special articles referring to the activities of the particular group there treated. These are particularly valuable to those who wish to learn more details. Their value is emphasized when one considers the great volume of recently published papers that are necessarily absent from the older manuals. *Insect Artizans* is published by the Van Press, Boston, 1936; the price is \$3.50.—E. A. P.

Exchange Snakes?

With a nice note about NATURE MAGAZINE, W. B. Harvey of Wall, South Dakota, sends us an interesting picture of an albino rattlesnake. He also says that he would like to get in touch with anyone interested in exchanging snakes and lizards with him.



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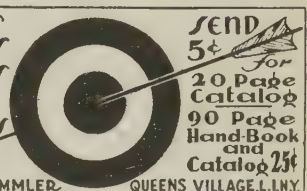
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Let Your Canary Fly!

By Gertrude Charny

Like the woman who shoved a caged canary across the counter of a bird store, saying, "I don't want him, he won't sing any more;" or like a shop keeper who let out his canary on a business street, not even bothering to take him to a woods, "because he was too busy to take care of him," there are many who look upon the canary not as a living being, but as a toy, or ornament, or commodity. And so there is much thoughtless cruelty and neglect, such as: keeping birds over hot radiators, in the monotony of dark corners, with covers high up (lest a seed spill) so that they can't even see out, or before electric lights so that they go blind, and in filthy cages so that they are subject to a long list of diseases. Some excuse all this by saying, "Canaries are used to it." Yes, the blind are "used" to being blind, and the poor are "used" to being hungry.

But there are millions of kind hearted people who have a feeling of affection for the sweet, gentle, golden little bird, sitting so patiently within his bars. At times there is a misgiving about keeping the little winged fellow a life-long prisoner; but, if let out would he not fly away, and what about the housekeeping problem? Both objections may be easily solved.

The flying away difficulty can usually be met by keeping screens in all the year round (they aren't damaged and need yearly painting anyhow), or ventilators.

Housebreaking requires only the simple combination of a mirror, a definite play place, and a comfortable perch. The principle involved is that a bird has both a sense of habit and of ownership. As soon as he feels that a place is meant for him, he will make that his home. Practically no harm will come from his flying around. It is the place where he perches for any length of time that needs to be protected.

The top of a dresser would do nicely, with a pretty jardiniere close to the mirror and a porcelain or china tray under the jardiniere. The jardiniere should be of unglazed pottery rather than china, which is too slippery for the bird's feet to grip. Only the jardiniere and the tray will require washing. The rest of the dresser and the house will remain clean. One thing—a flying bird is much more healthy than a caged one. The bird will spend a good deal of time on his play place. It should have a cloth cover, not glass or oilcloth, as these are slippery and cold. There should be ample space to hop around on. If a dresser-top is used, there should be no loose or open powder or rouge, pins, or sharp things.

A light and cheerful room is required. Many people do not know how responsive a canary is to pleasant surroundings. If a bedroom is not suitable, a shelf or table-top could be arranged elsewhere, with a mirror and perching-place.

A simple plaything is the tuft of a new dish mop, with the handle removed. This furnishes a nest, easy on the bird's feet, and clean, safe strings with which to play, without danger of the bird's getting tangled in them. Another nice thing that may be arranged is a tree. A vine can be trained around a branch from which the leaves have been removed, and a twig of the proper shape set in so as to make a natural perch.

The canary will love to sit in his little tree, and it makes a pretty sight. A paper or dish may be placed under the twig-perch. Ingenious people can work out other ideas for a comfortable and attractive perch. A suitable bowl for a bath should be used in the bird's room, but not on his play place, as he won't want to get that wet. It will be a great treat to watch him enjoy his daily splashing, and then go to curtains or cushions to dry his little head.

Every safeguard must be made when the bird is first allowed to fly. Windows and mirrors should have curtains or covering, because his first impulse will be to go for the light, and he is apt to dash against the glass and get stunned or hurt. Later he will understand about the glass and will never strike against it. It is best to begin with one light, safe, closed room, such as a bed room or living room.

Probably the bird will not come out of the cage when you first open the door. He can either be taken out by hand, or the perches can be removed and the top of the cage lifted off, so that he finds himself in the open. Some birds will fly with delight immediately, while others will need several trials. There must be careful watching until the bird becomes familiar with the house and his wings become stronger and his feet more steady. Then he will go voluntarily in and out of the open-door cage, for food and rest, and to sleep. It is not well to lock the bird when he goes in for food, as it will make him feel he is trapped and delay his becoming tame.

If the bird is left alone in the house, care must be taken that everything is made safe for him. There must be no cats or dogs, no open vessels of liquid, no fire, no sharp or poisonous things, no dark corners (for birds cannot see in the dark), and no places where he can fall into or get caught behind without being able to get out. Matches should have heads down.

I have known of two cases where canaries not only flew around in the house, but outdoors in a garden, the cage hanging in a tree.

It is a striking fact that a caged canary never becomes tame and friendly, while a free-flying one will become a real pet, manifesting a distinct individuality. The story of my Dickie is an illustration.

He not only had his own personality, but it was remarkably humanlike. Of curiosity he had a large bump. Anything new was promptly investigated. Given an alarm clock to play with, he not only imitated the ticking, but soon found the movable handle and knocked it up and down with pleased chirps. If the typewriter, which he followed with a musical accompaniment, was uncovered, he would busily hop all over it, as if exploring the mysteries. He was very sensitive, and I learned that I should not scold him severely. One day at the top of the curtains, he began energetically pulling at the wall paper, and I clapped my hands and talked harshly. He flew down and hid in a corner behind a vase, crying with a piteous little moaning sound for a long time, before I could make up with him. He had a beautiful dignity, which showed at its best when he performed for company. He seemed to realize that his singing was important, for he would place himself at a central point, make a few little bowing and turning preliminaries, and then sing as long as he was encouraged.

He liked variety and amused himself in different ways. For some weeks he exercised by a dexterous feat of climbing up and down curtains and sliding down the slippery arms of a chair. He liked especially to stand on the window sills and look out. Automobiles had a fascination for him, and pigeons frightened him. He looked up at the sky a great deal, especially to watch birds flying. Sparrows would hear Dickie sing and come to the window sill, and there would be a pow-wow between the golden fellow inside and the black ones outside.

With one exception he would never come to the table to eat unless he was invited—the sugar bowl had to be hidden. I used to call him when I had a special tid-bit, and he never refused what I gave him, looking up at me trustingly with his large, brown, jewel-like eyes set in gold. One day I had a tasty cantaloupe and called him, but he looked at the little piece on his plate beside mine, and there came such an expression of *purpose* on his face, like when one gets an idea, that I watched to see what he would do. He flew directly into his cage, took a little piece of egg, and without stopping to eat any, brought it next to the cantaloupe and ate it, as much as to say, "I don't care for cantaloupe, but I'll keep you company."

He always talked to visitors, but showed surprise at children—who were these smaller giants in this strange world of huge creatures that we people must have been to him? After all, he was a lonely little soul. He would hold long sessions with the bird in the mirror, kissing it, and actually talking to it, with the sweetest little inflections and variations. Often he would mope when he was left alone, and he would follow me around in the house.

He loved beauty. When there was a bouquet of flowers he would stand in front of it and sing to it. He liked the sunshine and fluffed out on the window sill a golden puff-ball. Strange to say, he enjoyed a snow storm, and would stand on the sill watching it. When there was frost on the window he would draw little marks with his bill, chattering with apparent glee.

He would fly to the radio and holler for it to be turned on. And the music had to be good. Tinkling music, violin and grand opera appealed to him most, and he sang in exquisite harmony. He liked running water and sang as I washed dishes.

And now the flash of golden wings through the house, his talking and singing are stilled forever. I did not know the ground was so hard in the winter. The little shovel broke, and I had to put him under just the clean snow. I had walked a long way in the cold to a wild bit of land. Before, unlike most people, I had not been deeply concerned about immortality. So much of life was interesting and wonderful, was not the gift enough? But now, as I carried the tiny thing that had been so active and was so still, I wanted to know. Cheated out of life here, exiled from his own kind, and from the sky, the trees, the sunshine, the long venturous flights through the sweet air, the work of his natural life, was he free somewhere in a beautiful place where he belonged?

The editorial staff of Nature Magazine would appreciate your answering the questionnaire that appears on pages 53-54 of this issue.

Under this title, a 538-page volume treating practically all the species of the higher fungi found in our northeastern states, under the authorship of Louis C. C. Krieger, has been issued by the Macmillan Company. Mushrooms are perhaps oftenest thought of as a food, but their presence affects man's destiny in many other ways. When we point out that yeast is a fungus, we need discuss this immediate subject no further. As bacteria, fungi build up soil fertility, remove waste vegetable and animal matter, and even cause diseases that affect human beings and other animals.

Mr. Krieger, in addition to being one of our foremost students of mycology, is an accomplished artist, and his colored plates of thirty-two of the more important edible and poisonous mushrooms are a valuable feature of the book. There are also numerous half-tones and line drawings, and keys and scientific descriptions of the hundreds of species that are treated.

Such subjects as Saprophytism; Symbiosis; Temperature requirements; Phototopyism; Fairy rings, Habitats, and Luminescence are discussed rather fully and interestingly, as well as methods of culture, and of cooking. Altogether it is one of the most thorough-going books on the subject that has yet appeared.

In bound form the book is obtainable from the Macmillan Company for \$3.50; and in paper cover from the New York State Museum, or from the author, for \$2.00.

Apiatia

Apiatia is a story of bees and honey that starts in the time of the author's boyhood on the banks of the Androscoggin in northern Maine, and carries on in many countries and through many years. In fact, the years it covers hark back to the times of Aristotle and Pliny and Virgil; and on to Leland O. Howard and Maurice Maeterlinck of our own times. It comprises a series of essays that can be read with profit, whether one be a lover of natural history or merely interested in good writing. It is published by Bruce Humphries, Inc., Boston, Mass., at \$1.00. E. A. P.

Biography

A biography, *J. Arthur Harris, Botanist and Biometrician*, has been released by the University of Minnesota Press, edited by three of Mr. Harris' associates at the University. The volume contains, besides a sketch of his life, reprints from papers on Mr. Harris' achievements in the fields of biology and biometrics. The volume is priced at \$2.25.

British Bird Book

A Pocket Book of British Birds, edited by Charles A. Hall and published by A. C. Black, Ltd., Soho Square, London, is available from the Macmillan Company, New York. The book is the response for a demand from field naturalists, hikers and students for volumes easily carried while on field trips, and contains color plates and descriptions of 63 British birds. The volume is priced at \$2.25.

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MAMMAL SOCIETY MEETING

(Continued from page 47)

United States. Remington Kellogg was named to this post. He attended the meeting of the Economic Committee of the League in Berlin in April, 1930. This parley resulted in the drafting of the whaling Treaty.

The committee on Economic Mammalogy, Adolf Murie, Chairman, presented an acceptable report reporting satisfactory progress. That on the Conservation of Land Mammals, W. E. Sanderson, Chairman, stressed campaigns against predatory mammals, and deplored the issuance of films and other forms of publicity by Federal and State agencies that stress the destructive habits of mammals, without calling attention to other habits that may atone for the harmful ones.

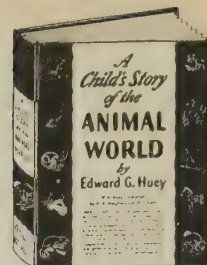
Another resolution, presented by the committee on Life Histories and Ecology, George M. Wright, Chairman, concerned abuses resulting from mammal control programs carried on by untrained personnel on relief operations. The main recommendation was to the general effect that no work involving the destruction of mammals alleged to be harmful should be undertaken without prior approval by a committee qualified to pass on the need of reducing the numbers of the species involved, this committee to consist of representatives of the operating emergency agency and of the Biological Survey. After considerable discussion, and a slight modification of the provisions, this resolution was unanimously adopted by the membership.

Following the annual dinner on the evening of May 14, a film entitled "Eight Thousand Miles of Northern Wilderness" was presented by George G. Goodwin, who accompanied the Henry Snyder 1935 Barren Land Expedition. Motion pictures of wood bison, muskoxen, caribou, and white and Stone's sheep gave a surpassing exhibit of these notable mammals.

On viewing these excellent pictures, in which many scenes familiar to him from long past experiences passed in bewildering review, the writer was naturally led to compare the changes in transportation methods, for most of the country visited by this party in airplanes, in a few days' traveling time, was covered by him thirty years ago by the slow and laborious tedium of canoe and pack train, methods that consumed the open seasons of several years.

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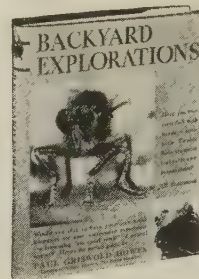
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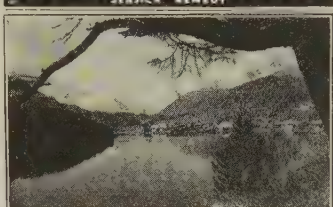
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Our Friends the Mayflies

Mayflies are very fragile insects of singularly beautiful form and of very peculiar and interesting habits. In their immature stages they are all aquatic, and the adults are to be met with only near the water. As a group they have received comparatively scant attention from students and collectors of insects, though they are well known to fishermen and others, and even some of the poets and philosophers appear to have heard of them. The newly issued book entitled *The Biology of Mayflies* by Dr. James G. Needham of Cornell University, assisted by specialists in certain subjects, contains much information in a compact form regarding these little creatures. Divided into two parts, the first takes up such matters as life history, internal and external structure of the various stages, eggs and oviposition, the life cycle, casualties and enemies, values and uses, and data on collecting, preserving and rearing mayflies. The second part contains a systematic account of the various North American species in both adult and nymphal stages, accompanied by numerous analytical keys for use of technical workers. Published at \$7.50 by the Comstock Publishing Company of Ithaca, New

York, the volume contains 759 pages, 40 plates, and 168 text figures, and a comprehensive bibliography of the subject. The mayfly has the briefest existence known in the winged state among insects, being in some instances a mere matter of hours, so that its period of terrestrial life is so brief that it has often served writers and orators as a figure of fugitive existence. It is, therefore, fitting that the introduction to Dr. Needham's volume should quote Benjamin Franklin's whimsical, clever "Soliloquy of a venerable Ephemera who had lived four hundred and twenty minutes." It is a pertinent commentary on the life both of man and insects.

Treasure Hid in the Sea

An enormously stimulating field for observation and research lies in the study of the Algae. To many who have become interested in these curious plants, it is like a veritable visit to a wonderworld. All such people will find helpful the newly issued volume entitled *The Algae and Their Life Relations* by Professor Josephine E. Tilden of the University of Minnesota, and published by the Oxford University Press, London, and the University of Minnesota

Press at Minneapolis. This book undertakes to deal with such matters as the phylogeny of the blue-green, red, brown, yellow-green, and green algae; the distribution of marine algae in time and space; their classification based on evolutionary development; pigmentation and food reserves; the various classes of algae; the problem of algal control; algae as food for animals and for man; and marine algae as our richest source of vitamins. The volume contains 550 pages and 257 figures as well as a bibliography of over 600 titles. It is pointed out by the author that seaweeds form a marvelous article of diet, especially when compared with land plants grown on the soils of the so-called "goitrous regions" of the United States, which are entirely lacking in iodine. At least forty-eight chemical elements are known to exist in the ocean, including all those used by these plants. In a word, then, the sea holds for civilized races the solution of many of the deficiency problems of the medical profession. Marine biology is a comparatively new field, but, according to Sir John Murray, the sea appears to be capable of a productivity equal to that of the land. Certain it is that we do not yet realize the richness and vastness of the treasure now hidden in the sea.

Photographic Notes

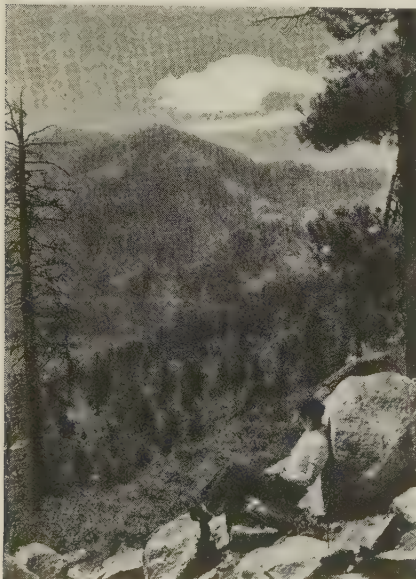
BY SAMUEL BROWN

Mountain Photography

With many of us going on our vacations to the mountains this month, we will have some excellent opportunities to get photographs of mountain scenery. Pictures of this type, if properly taken, have a rare beauty and distinctive interest. Besides the pictures of the mountains themselves, we will want some shots of the winding dirt roads, the spring and of the many wild flowers to be found on the trails.

Beautiful scenery is apparent at every turn and our first thoughts should be given over to composition. A bare hillside becomes a lovely pasture when a few cows are grazing on it; a straight road is transformed into one of interest when a curve is included and figures on it often add to its beauty; a reflection of a peak in a mountain lake is a scene to delight the eye.

Lighting is another consideration of primary importance. The variations in lights and shadows give the picture roundness and depth and make the subject stand out from its surroundings. Shadows should not be too heavy but full of detail. Full exposure should be given. The best time to make this type of picture is during the early morning or late afternoon when the sun will strike the subject at an angle. A good position for the sun is a little to one side and behind the camera. Attractive pictures can also be taken with the sun shining at an angle toward the camera and sometimes directly in front of it. However, when working in this manner, considerable care should be taken to avoid having the light strike the lens. A sunshade will be found useful for this or, if one is not available, the hand or a hat may be used to cast a shadow or take



A MOUNTAIN VISTA, TAKEN UNDER A BRILLIANT SUN WITH S.S. PAN USING A K-2 FILTER. 1/25 OF A SECOND AT F. 16



A MOUNTAIN ROAD. TAKEN ON EXTREMELY HAZY AFTERNOON WITH SUPER-SENSITIVE PANCHROMATIC FILM. EXPOSURE, 1/25TH OF A SECOND AT F. 11

a position behind a tree.

If possible, try to include some clouds in the photograph—a sky or yellow filter may be used to record these. Small stops such as F. 16 to F. 32 are generally recommended for greater depth of focus. Panchromatic films are especially valuable for correct color renditions.

Photographing the mountains themselves present several difficulties not usually encountered. The greatest factor is the ever present haze. This is due to the particles of moisture in the air which scatter the ultra-violet rays of light to which the photographic emulsions are particularly sensitive. This haze is not always visible to the eye and is likely to be disregarded as unimportant by the photographer. However, haze will register on the film as fog and what appeared to be a clear scene will be utterly disappointing as a picture. There are several ways to eliminate haze. One method is to use a panchromatic film which is less sensitive to the lower end of the spectrum, which includes the ultra-violet and blue rays, and more so to red which comes through the haze unobstructed. A yellow filter is also useful for holding back blue light. When used in conjunction with panchromatic films they make an excellent combination. A K-2 filter will be found best.

The point of view from which taken is very important in a mountain scene where majesty and greatness should be portrayed. If a low point of view is selected, the peak will appear dwarfed while the same will be true if taken from another mountain top. The best vantage point is a ledge or foot-path opposite the center of the subject.

Perspective and proportion are equally important factors. If a photograph is taken of a large mountain in the distance with a

smaller one in the foreground, the last mentioned will appear considerably larger in proportion to the other one. Here again a change of point of view would give a truer rendition of perspective and proportion. Many times also, when looking at a picture of a mountain, we gain little or no idea of its size because there is nothing of known size with which to compare it. A person in the scene helps to eliminate this doubt and is often an asset to the composition.

Exposures must be shortened at great heights. Actinic rays of light have a greater intensity than those at low points and fast exposures are longer than is generally supposed. If, at a certain diaphragm opening, 1/25th of a second is usually used, it will be found that 1/50th of a second is sufficient at high altitudes.

Mountain photography is a fascinating phase of picture making. Each day and hour, with its variety of lights and shadows, will make a different picture. As the sun rises or sets over the peak, the sight is really a spectacle to behold and to capture on the film of your camera.

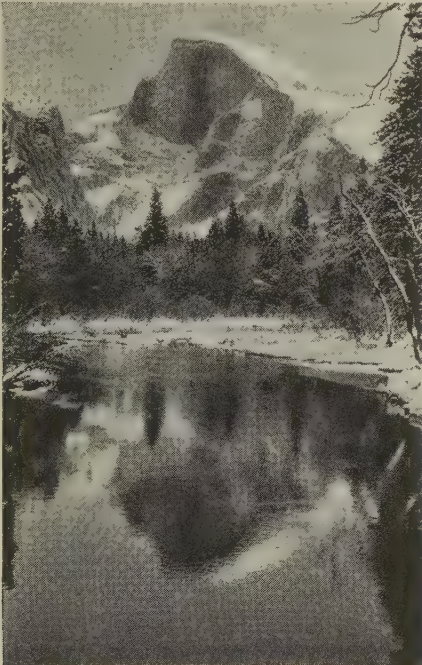
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Camera Types

Twin lens reflex cameras differ from the Graflex type, discussed last month, in that the former has two lenses while the latter has only one lens. Actually, cameras working on the two lens system are two cameras in one, built as close together as possible, one over the other. The upper camera has only one function, namely, to act as the finder. The lower one, of course, is the taking camera. Both lenses are carefully matched so that the image that is seen on the ground glass is the same as the picture that will appear on the finished print.

The latest models of two lens cameras have many features which make picture taking with them easy. A number of available accessories adapt them for a great variety of subjects and permit considerable latitude in use. Convenience in the placement of the controls makes operation simple and fast with a minimum of effort. Outstanding cameras in this class are the Rolleiflex, Superb and Welta Perfekta. All of these cameras permit twelve exposures, size 2 1/4 by 2 1/4 inches, on a roll of regular eight exposure #120 film which makes operation economical with the greatest degree of precision.

Due to the separation between the finder and the taking lenses, there is a slight deviation of parallax. This is practically unnoticeable when photographing distant objects but is very apparent in close-ups. Compensation for this is made in the Rolleiflex and Perfekta cameras by making the ground glass screen of the finder system one millimeter smaller on each side than the negative. In the Superb, parallax is adjusted automatically when focusing. The upper camera tilts forward as the camera is adjusted for close objects, giving perfect correction.



A MOUNTAIN REFLECTION TAKEN AT F. 11, 1/25 OF A SECOND USING A K-1 FILTER

Some of the advantages of twin lens reflex cameras are that focusing is accomplished with the lens wide open which assures a bright image full size and right side up, constantly visible up to and during the exposure; all adjustments, including the stop number and exposure setting, are visible when the camera is held in the taking position; proxar lenses permit extreme close-ups and the focusing control is at the finger tips.

Twin lens reflex cameras are particularly useful to the Nature photographer. Their versatility permits picture taking of almost every type of subject and under practically every condition.

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questions concerning filters that we have secured a leaflet regarding these which is available without charge. Filters, if properly used, are often the means of securing a good picture of an unattractive subject or of one which is likely to register poorly on the film. This leaflet gives details about filters and how and when to use them. Ask for the "Zeiss Yellow Filters" leaflet and enclose a stamped self-addressed envelope with your request. The supply is small, so get your request in early.

* * *

The fifth edition of *Photo Markets* by John P. Lyons has recently made its appearance. *Photo Markets* has always been recognized as a reliable guide for photographers wishing to sell their pictures. The fifth edition contains many new features while the price remains the same at 50 cents. Published by John P. Lyons, Barrister Building, Washington, D. C.

* * *

The Central Camera Co., 230 So. Wabash Ave., Chicago, Ill., has announced three new cameras. The "3-4" *Mentor* is small, taking 16 pictures on a roll of vest pocket film; the *Pilot*, a small twin lens reflex camera uses vest pocket film and takes twelve pictures on a roll and the "Mentorette", a larger reflex, takes twelve pictures on #120 rolls. Each of the above is a precision instrument and comparatively inexpensive. Further information is contained in Central's new 148 page almanac. Incidentally, do not fail to send for this book. Articles by William Mortenson, Edwin Benedict and others makes this a fine addition to your photographic literature. No charge, but please mention NATURE MAGAZINE.

* * *

The Eastman Kodak Co., Rochester, N. Y. announces the latest idea in photographic albums. *The Snapbook* is a 20 page, spiral bound album and is supplied with *The Snapbook Frame*. Any page of the album may be displayed in the frame at will. The combination makes a fine appearance and is sold as a complete unit for 75c.

* * *

How To Use Your Candid Camera by Ivan Dmitri. Published by Studio Publications, Inc., 381 Fourth Ave., New York, N. Y. Price \$3.50.

Mr. Dmitri has long been recognized as an illustrator of outstanding merit and a book by him has been awaited by photographic enthusiasts everywhere. *How To Use Your Candid Camera* is the result of an interview when a gentleman visited Mr. Dmitri and asked if he could explain simply and quickly how to use the Leica camera. This was done and the inquirer was enabled to take hundreds of good pictures. Mr. Dmitri felt that there were probably many persons who would want these same instructions quickly and briefly explained and so he wrote *How To Use Your Candid Camera*. The 56 full page illustrations, representative of Mr. Dmitri's work with a miniature camera, are an inspiration to the owner of any camera.

* * *

The Fomo Publishing Co., Canton, Ohio, publishers of popular photographic books, have brought out two new books that cover two important phases of photography.

The Fine Grain Negative by Augustus

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WESTERN BIRD GUIDE, by Chester A. Reed and others, Imitation

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Each page contains a color picture of one or more birds—480 in all. The text gives common and scientific name, size in inches, distinguishing characters in summer and winter, description of nest and eggs, and where seen at various seasons. Describes the typically Western birds and those likely to be seen from the Rockies to the Pacific. Alphabetically indexed. 252 pages, 5½ x 3¼.

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* * *

The photographic department of Nature Magazine is devoted to its readers interested in photography and maintains a service which renders assistance with any photographic matter. You are invited to take advantage of this service. Address all photographic inquiries to Samuel Brown, Nature Magazine, 1214 Sixteenth Street, N. W., Washington, D. C.

Cordially,

Samuel Brown

Dr. Charles E. Johnson

Dr. Charles E. Johnson, Director of the Roosevelt Wild Life Forest Experiment Station and professor of zoology at the New York State College of Forestry, Syracuse, N. Y., died June 6 of a heart ailment. He was 56 years of age. He was a graduate of the University of Minnesota and had been a teacher in the College of Forestry thirteen years. He was the author of many publications on wild life conservation and had been director of the station since 1926 following the appointment of Dr. C. C. Adams who became director of the State Museum in Albany.

Take Your Home With You

Tourists who tour the country via automobile and desire to avoid the big cities and yet have all the comforts of home will be interested in A. Frederick Collins' new book, *How to Build Motor Car Trailers*. The volume gives complete information on the construction of trailers at a cost of from \$300 to \$1,300. The de-luxe stream-lined model is complete with stove, bath, air brakes, and has practically everything except a fireplace. The book, priced at \$2.00, is available from the publishers, J. B. Lippincott Company, Philadelphia.

Astronomy Clarified

Frank Reh, the architect who aided in the creation of the Lincoln Memorial at Washington, began his study of astronomy during his college days and has pursued his hobby for nearly 30 years. Today he is instructor of astronomy at Hunter College. His latest book, *Astronomy for the Layman*, covers all phases of this intriguing science but purposely avoids detailed discussion of technical matter. The author has written his book in such an absorbing manner that all who read it must realize that the inhabitants of this tiny planet, compared to the universe around us, are nonentities indeed. The book is available from D. Appleton-Century Company, New York, for \$3.00.

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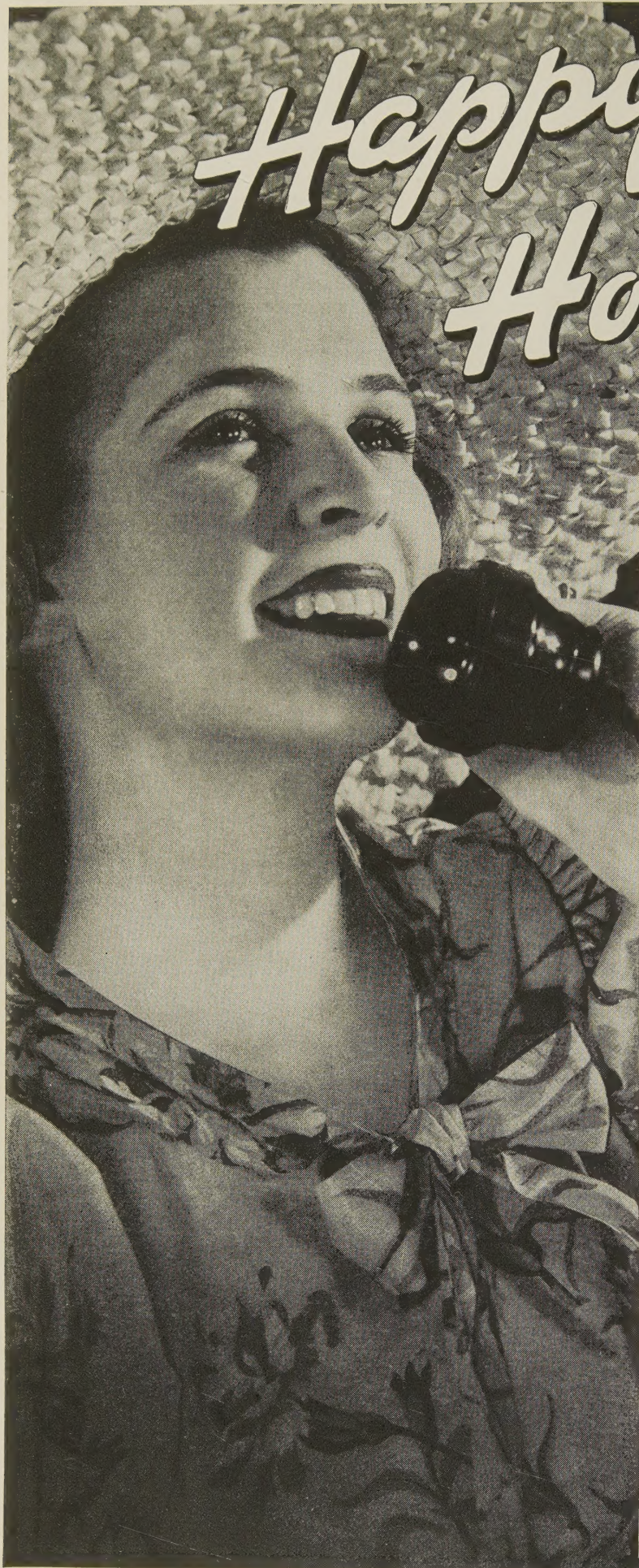
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BELL TELEPHONE SYSTEM

In August, Florence Merriam Bailey

Mrs. Florence (Augusta) Merriam Bailey,
1834 Kalorama Road,
Washington, D. C.

Dear Mrs. Bailey:

It may be that August 8 can be made a happier birthday for you this year by a remembrance of the fact that this hot month of August, as well as the more pleasant seasons of our Temperate Zone, has been enriched for every lover of the outdoors by your contributions to our American literature on Nature. "Many a man," John Milton said, "lives a burden to the earth, but a good book is the precious life-blood of a master-spirit embalmed and treasured up on purpose to a life beyond life." Here, on this desk in a Washington apartment, as on the shelves of readers in many places, is a whole row of "good books" in which you have treasured up knowledge and inspiration of the out-of-doors. Their remembrance must be very precious in your sight.

This small brown volume, your *Birds Through an Opera-glass*, published for the Chautauqua Literary and Scientific Circle back in 1889, the dark green monumental *Birds of New Mexico*, as recent as 1928, and in between them the buff book with its small maroon letters, *My Summer in a Mormon Village*, the pale green *A-Birding on a Bronco*, your *Birds of Village and Field* with its worn red covers, and this invaluable dark blue *Handbook of the Birds of Western United States*; these bound volumes of "The Condor" and "The Auk" and "Bird-Lore" in which your hundred or so contributions are preserved; and those works that are not on this desk tonight, among them *Birds of the Santa Rita Mountains in Southern Arizona*, and *Wild Animals of Glacier National Park*, in which you found collaboration with Vernon Bailey, in writing as well as in living—these works must be even more precious in your recollection than they are in one's possession. Mrs. Bailey: Congratulations, and thanks!

You may remember that a few weeks ago you expressed the casual and graciously modest opinion that your works would hardly furnish good material for writing on August, and yet the rich experiences that are possible in even this worst of summer months are nowhere more clearly and enticingly represented than in these writings of your own hand.

Think how refreshing it must be for a reader to come across this sentence in *My Summer in a Mormon Village* (your summer once; now anyone's summer): "Then came the August flowers, the pink wild roses brightening the roads, the wild sunflowers growing by the dark marshes and bordering the meadow fences, as our goldenrod does at home." And think of the delight of one reading your article on "Red Letter Days in Southern California" in "The Condor" for 1917 and coming across this sentence, on August 14: "Here the level floor of the San Jacinto plain presented a characteristic desert picture, the soft

blue bulk of the San Jacinto Mountains having a foreground of pale desert colors brightened by acres of pink abronias, wide stretches of yellow tar weed, and fields of sunflowers with faces turned toward the sun, fields that went well with the fresh, uplifted song of the meadow-lark."

Many have lifted their eyes to the mountains during hot August days and climbing upward have taken themselves backward toward spring in the progression of the seasons. You have increased the enjoyment of life for these by telling that story on "Climbing the Wasatch with a Professor", which concludes *My Summer in a Mormon Village*—"among glacier-worn canyons" and "exquisite clusters of blue flax, tall groups of white columbines of surpassing purity and beauty, rich purple monkshoods, luxuriant clumps of mertensias, of such delicate Frenchy pink and blue shading that my friend", you wrote, "dreamed of them after she got home."

Many readers will share your interest that day in botany and geology and your experience with the family of ground squirrels that "frisked about the rocks, popping up out of one dark hole to disappear down another", and with the pretty chipmunk that answered your coaxing, and not only climbed up in your lap, but sat in your hand picking up crumbs, while you talked caressingly to him, stroking his soft striped fur. This August experience with mammals in Utah also carries at least one reader's recollection forward to those brief descriptions of the muskrat that you included in your article on "A Return to the Dakota Lake Region" in "The Condor" 1918-20. "At a sudden *plunk* at the end of the Bridge below me," you wrote, "I peered down discovering the head of a swimming muskrat. Its nose was well up out of the water, and I could see its hairy back and long ratty tail as it swam. But just then it dived under the Bridge and was seen no more"—until by the magic of words you made it visible for anybody at any time. And you soon "did it again," telling how, as the muskrat "swam past a family of half grown grebes, they all looked at him, when one inquisitive little Pied-bill swam after him, close to his wake; and as the furry ears disappeared, he too went below, as if to investigate his strange neighbor's house."

Should you ever show this letter to those who know you well and know your books, they will marvel that its writer could say so little about the birds you have told about in August—the white-bellied nuthatch in your *Birds Through an Opera-glass* whose nasal *yank* in August "is sometimes run into an accelerated half song"; the red-eyed vireo, whose song comes "through the open window in summer . . . when the midday heat has silenced nearly all the others"; the black-throated blue warbler that you saw one "August suing very humbly for his little lady's favor"; and the hermit thrush of which you once wrote: "Ever since I (Continued on page 127)



The above two photomicrographs show, (left) in 4 minute and (right) in 96 hour exposure, the pollen-sac "hooks" and their life-movements that possibly create lesions in nasal tissue. These "hooks" are on a sperm-sac similar to but larger than the ragweed pollen, and as reproduced are magnified about 8,000 diameters. It was found necessary for clarity to photograph this larger sperm-sac, because even the slightest vibration of microscope or of camera gave a blurred image of the actual and very tiny ragweed "hooks", shown in tip-profile at the left inset at a magnification of 17,500 diameters. Visually the life-movements of both are the same. Below are shown the pairing-off and definite intergrowth of two virile ragweed pollen out of a group, cultured as described in the accompanying article. In this photograph, the culture has proceeded about one-third of the way and the beginning-development of spine ends is observable. Magnification is about 5,500 diameters

